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A fully illustrated guide to Modern Machine-Guns

WAR MACHINE

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Modern Machine-Guns

An American soldier in Vietnam uses an M60 from an emplaced position, with plenty of ammunition belts ready to hand. In such belts about one round in six is tracer.

The use of automatic weapons steadily increased during World War II, and today most infantrymen carry weapons capable of burst fire. But the machine-gun remains the prime firepower component of the infantry squad, and classic designs like the Bren have lost none of their effectiveness.

The modern machine-gun is still one of the foot soldier's most powerful weapons, but it has changed much since World War I, when the machine-gun dominated the battlefields of France and elsewhere. Today's machine-gun is much lighter, more reliable and in general more flexible in its tactical applications. Most of the machine-guns here discussed are portable enough to be used in locations where it was once unthinkable that such weapons could even be carried, but they are still as lethal and efficient as they ever were.

The machine-gun is now in its second generation of development since World War II. The first generation weapons are still very much in evidence with virtually every armed force in the world, and are the post-war general-purpose machine-guns, or GPMGs. In the years after 1945 the GPMG was embraced by many as the way ahead in machine-gun design, but the soldiers in the front line discovered the hard way that the all-purpose machine-gun is as much a myth as the all-purpose truck. Thus the second generation of machine-guns is now entering service.

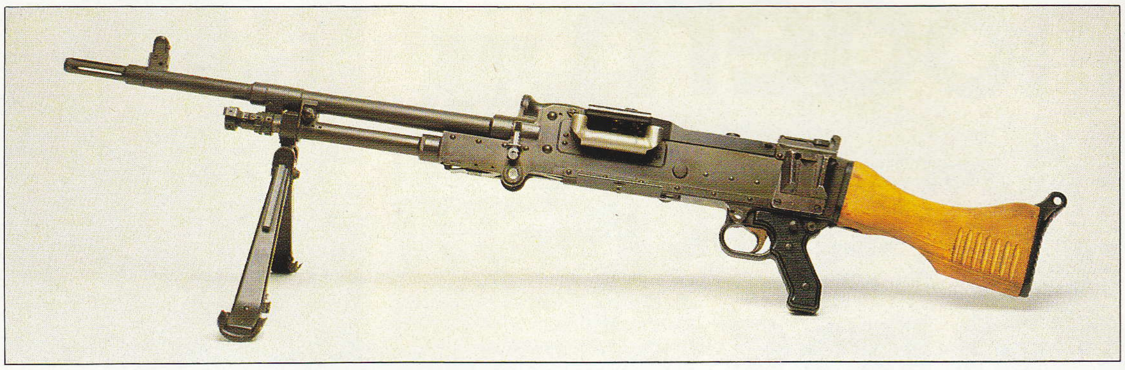
The second-generation weapons are more specialized than the GPMGs. The light machine-gun has made a come-back as the squad support weapon, while the heavy machine-gun has returned in the form of the post-war GPMGs retained for the heavy fire-support role. They are now in the position of either being retained indefinitely, or are slowly being replaced by the larger-calibre weapons such as the really heavy machine-guns (of 12.7/0.5-in calibre and upwards) or the machine weapons now generally known as cannon. It is the machine-guns that are covered in this study.

At first sight the variety of modern machine-guns looks somewhat bewildering, and the types mentioned here are but a selection of what is available. More types than can be covered in these pages are around or in the wings, for machine-gun development is still very progressive. Nearly all the major nations are either attempting to gild the lily by using the existing types, or alternatively chasing the myth of the perfect design. Some of the designs mentioned here do appear to have achieved near-perfection, for how otherwise can one contemplate the longevity of the MG3 and L4A4 Bren Gun designs? Others, such as the M60, make one wonder how they have lasted so long.

The most widely-used present-day version of the World War II Bren gun is the British L4A4, a conversion to standard NATO calibre. Seen here in action with the South African Army, it is also used by the British and many of the ex-Commonwealth armies, including India.

BELGIUM

7.62-mm FN MAG



The Belgian FN MAG is one of the most widely used of the post-World War II general-purpose machine-guns. Well made from what are usually solid metal billets machined to spec, the MAG is a very sturdy but heavy weapon that is still in production worldwide.

World War II established the general-purpose machine-gun (GPMG) as a viable weapon with its ability to be fired from a light bipod in the assault role and from a heavy tripod in the defensive or sustained role. After 1945 many designers tried to produce their own version of the GPMG concept, and one of the best was produced in Belgium during the early 1950s. The company concerned was Fabrique Nationale or FN, based at Herstal, and its design became known as the **FN Mitrailleuse d'Appui Général** or **MAG**. It was not long before the MAG was adopted by many nations, and today it is one of the most widely-used of all modern machine-gun designs.

The MAG fires the standard NATO 7.62-mm (0.3-in) cartridge and uses a conventional gas-operated mechanism, in which gases tapped off from the barrel are used to drive the breech block and other components to the rear once a round has been fired. Where the FN MAG scores over many comparable designs is that the tapping-off point under the barrel incorporates a regulator device that allows the firer to control the amount of gas used and thus vary the fire rate to suit the ammunition and other variables. For the sustained-fire role the barrel can be changed easily and quickly.

In construction the MAG is very sturdy. Some use is made of steel pressings riveted together, but many components are machined from solid metal, making the weapon somewhat heavy for easy transport. But this structural strength enables the weapon to absorb all manner of rough use, and it can be used for long periods without maintenance other than changing the barrels when they get too hot. The ammunition is belt-fed, which can be awkward when the weapon has to be carried with lengths of ammunition belt left hanging from the feed and snagging on just about everything.

When used as an LMG the MAG uses a butt and simple bipod. When used as a sustained-fire weapon the butt is usually removed and the weapon is placed on a heavy tripod, usually with some form of buffering to absorb part of the recoil. However, the MAG can be adapted to a number of other mountings, and is often used as a co-axial weapon on armoured vehicles or as a vehicle defence weapon in a ball mounting, and as an anti-aircraft weapon on a tripod or vehicle-hatch mounting. It is also used on many light naval vessels.

The MAG has been widely produced under licence. One of the better-known nations is the UK, where the MAG is known as the **L7A2**. The British introduced some modifications of their own, (and have produced the weapon for export), and there is no sign of it being replaced in the foreseeable future as far as the British armed forces are concerned. Other nations that produce the MAG for their own use include Israel, South Africa, Singapore and Argentina, and there are others. Even longer is the list of MAG users: a brief summary includes Sweden, Ireland, Greece, Canada, New Zealand, the Netherlands and so on. There is little chance of the MAG falling out of fashion, and production continues all over the world.

Specification

FN MAG

Calibre: 7.62 mm (0.3 in)

Weights: gun only 10.1 kg (22.27 lb); tripod 10.5 kg (23.15 lb); barrel 3 kg (6.6 lb)

Lengths: gun 1260 mm (49.61 in); barrel 545 mm (21.46 in)

Muzzle velocity: 840 m (2,756 ft) per second

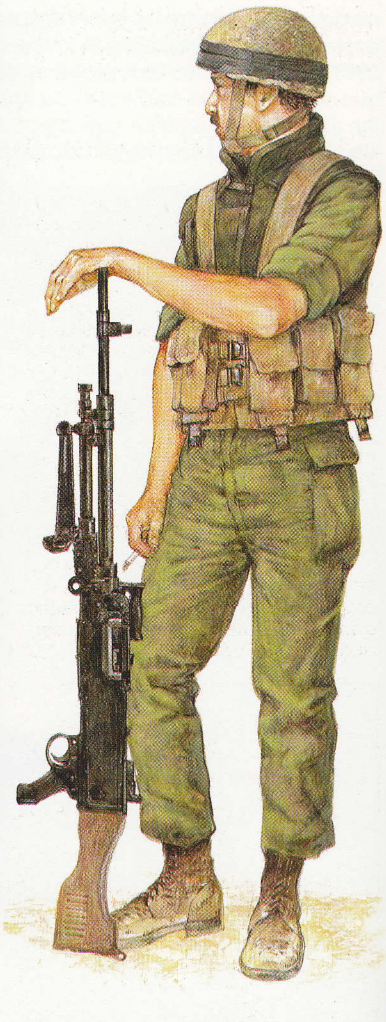
Rate of fire: (cyclic) 600-1000 rpm

Type of feed: 50-round belt

Above: During the Falkland Islands campaign L7A1s were hastily pressed into use on improvised anti-aircraft mountings to provide some measure of defence against Argentine attacks on the shipping in San Carlos harbour.

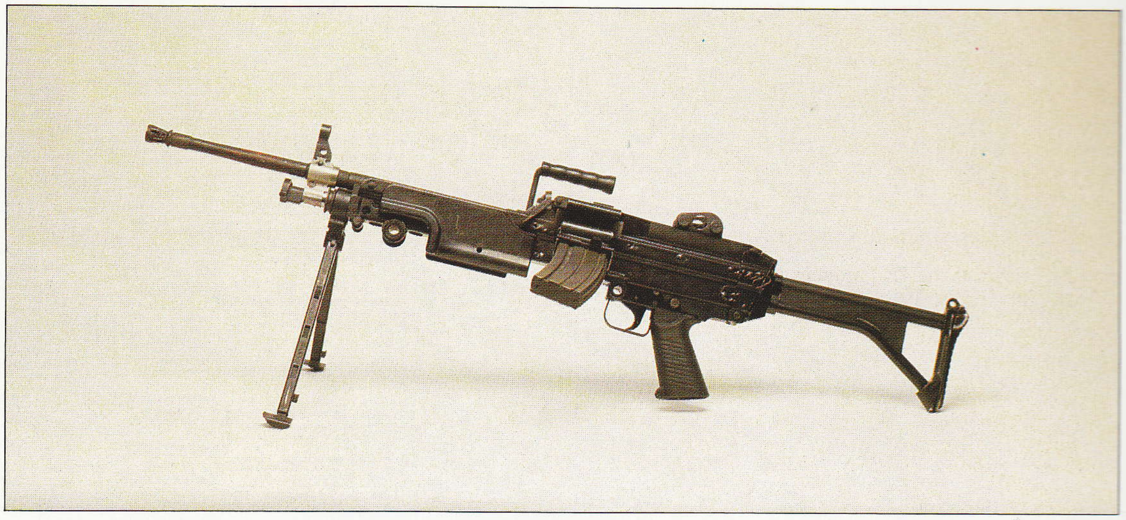
Below: The FN MAG is fitted to the turrets of the German Leopard 2 tanks in service with the Dutch army. Pictured here in September 1984 on Exercise 'Lionheart', the MAG has been fitted with a blank firing adaptor.

Below: The FN MAG is licence-produced in Israel by Israel Military Industries and is used by all branches of the Israeli armed forces.



BELGIUM

FN 5.56-mm Minimi



With the turn away from the heavy NATO 7.62-mm (0.3-in) cartridge towards the smaller 5.56-mm (0.219-in) round for use by the standard rifles of most of the NATO nations (and many others), it followed that there was a need for a light machine-gun to use the new calibre. FN accordingly drew up the design of a new weapon that eventually became known as the **FN Minimi** and was first shown in 1974. The Minimi is intended for use only as a squad support weapon as there is no way that the light 5.56-mm cartridge can be used effectively for the heavy support or sustained-fire role, for it simply lacks the power to be effective at ranges much beyond 400 m (437 yards). Thus heavier-calibre weapons such as the FN MAG will still be retained for this role in the future.

The Minimi uses some design features from the earlier FN MAG, including the quick-change barrel and the gas regulator, but a new rotary locking device is used for the breech block which is guided inside the receiver by two guide rails to ensure a smooth travel. These latter innovations have made the Minimi into a remarkably reliable weapon, and further reliability has been introduced into the ammunition feed. This is one of the Minimi's major contributions to modern light machine-gun design as it does away with the long and awkward flapping ammunition belts used on many designs and which snag on everything when carried. The Minimi uses a simple box (under the gun body) which contains the neatly-folded belt. When the weapon is fired from a bipod, the box is so arranged that it will not interfere with normal use and on the move it is out of the way of the carrier. But the Minimi goes one step further: if required, the belt feed can be replaced by a magazine feed. FN has shrewdly guessed that the American M16A1 rifle would quickly become the standard weapon in its class, and has thus made provision for the Minimi to use the M16A1's 30-round magazine. This can clip into the receiver just under the belt feed guides after the belt has been removed.

The association with the American M16A1 rifle has turned out well for FN, for the Minimi has been adopted as the US Army's squad fire-support weapon, and is now known there as the **M249 Squad Automatic Weapon**, or **SAW**. This version will fire the new standard NATO SS109 5.56-mm cartridge rather than the earlier M193 cartridge. The SS109 has a longer and heavier bullet than the earlier cartridge and uses a different rifling in the barrel, but is otherwise similar to the American cartridge.

Two possible variants of the Minimi are a 'para' version which uses a shorter barrel and a sliding butt to make the weapon shorter overall, and a vehicle model with no butt at all for mounting in armoured vehicles. The Minimi itself has many ingenious detail points as well: the trigger guard may be removed to allow operation by a man wearing winter or NBC warfare gloves, the front handguard contains a cleaning kit, the ammunition feed box has a simple indicator to show how many rounds are left, and so on.

Overall the Minimi may be regarded as one of the best of the new family of 5.56-mm light machine-guns. It will be around for a very long time.

The FN Minimi has been adopted by the US Army for the Squad Automatic Weapon (SAW) as the M249. It is now entering service with the airborne divisions of the Rapid Deployment Joint Task Force (RDJTF).

Specification

FN Minimi

Calibre: 5.56 mm (0.219 in)
Weights: with bipod 6.5 kg (14.33 lb); with 200 rounds 9.7 kg (21.38 lb)
Lengths: weapon 1050 mm (41.34 in); barrel 465 mm (18.31 in)
Muzzle velocity: (SS 109) 915 m (3,002 ft) per second
Rate of fire: (cyclic) 750-1000 rpm
Type of feed: 100- or 200-round belt, or 30-round box magazine

CZECHOSLOVAKIA

7.62-mm vz 59

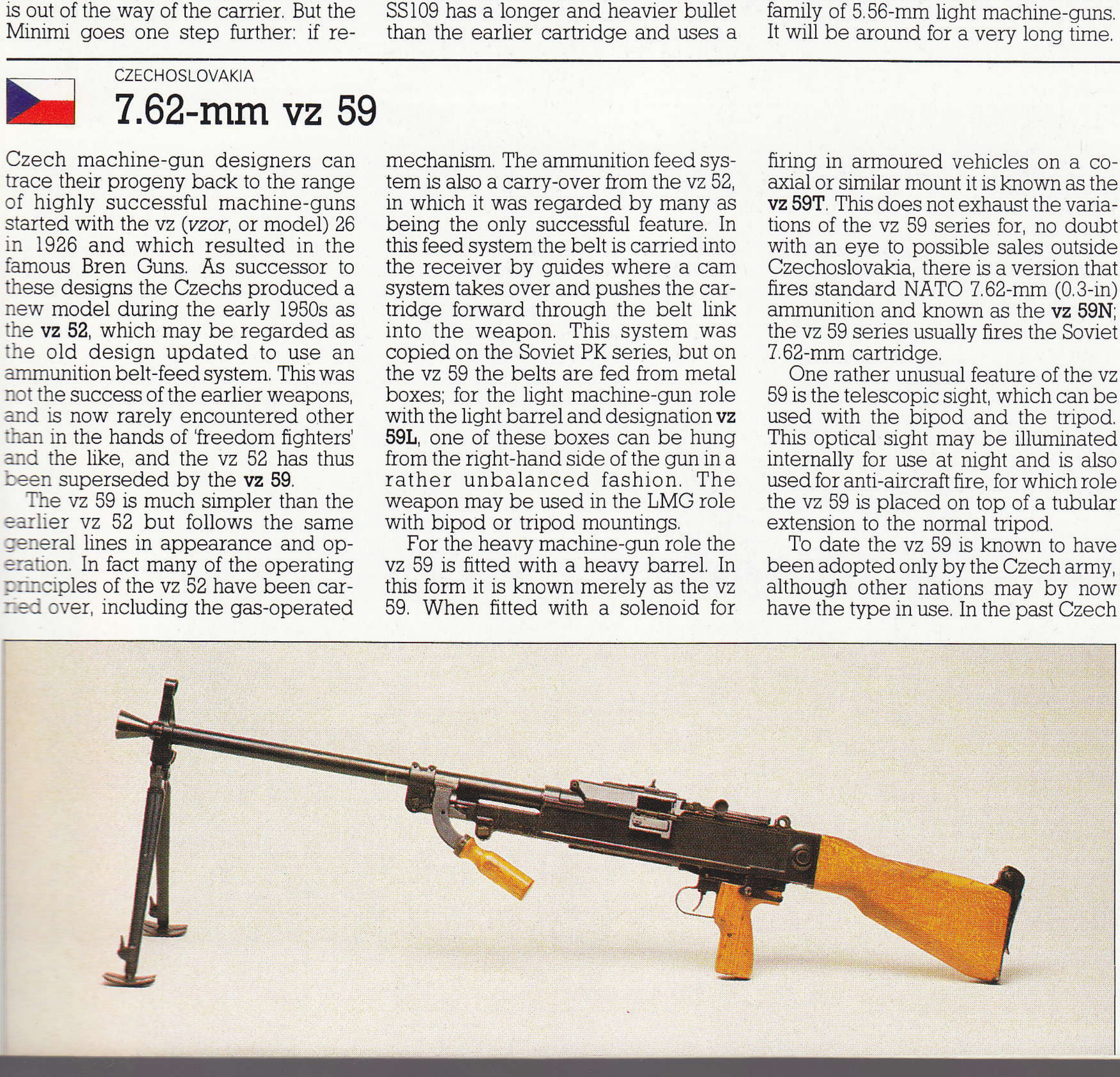
Czech machine-gun designers can trace their progeny back to the range of highly successful machine-guns started with the vz (*vzor*, or model) 26 in 1926 and which resulted in the famous Bren Guns. As successor to these designs the Czechs produced a new model during the early 1950s as the **vz 52**, which may be regarded as the old design updated to use an ammunition belt-feed system. This was not the success of the earlier weapons, and is now rarely encountered other than in the hands of 'freedom fighters' and the like, and the vz 52 has thus been superseded by the **vz 59**.

The vz 59 is much simpler than the earlier vz 52 but follows the same general lines in appearance and operation. In fact many of the operating principles of the vz 52 have been carried over, including the gas-operated mechanism. The ammunition feed system is also a carry-over from the vz 52, in which it was regarded by many as being the only successful feature. In this feed system the belt is carried into the receiver by guides where a cam system takes over and pushes the cartridge forward through the belt link into the weapon. This system was copied on the Soviet PK series, but on the vz 59 the belts are fed from metal boxes; for the light machine-gun role with the light barrel and designation **vz 59L**, one of these boxes can be hung from the right-hand side of the gun in a rather unbalanced fashion. The weapon may be used in the LMG role with bipod or tripod mountings.

For the heavy machine-gun role the vz 59 is fitted with a heavy barrel. In this form it is known merely as the vz 59. When fitted with a solenoid for firing in armoured vehicles on a co-axial or similar mount it is known as the **vz 59T**. This does not exhaust the variations of the vz 59 series for, no doubt with an eye to possible sales outside Czechoslovakia, there is a version that fires standard NATO 7.62-mm (0.3-in) ammunition and known as the **vz 59N**; the vz 59 series usually fires the Soviet 7.62-mm cartridge.

One rather unusual feature of the vz 59 is the telescopic sight, which can be used with the bipod and the tripod. This optical sight may be illuminated internally for use at night and is also used for anti-aircraft fire, for which role the vz 59 is placed on top of a tubular extension to the normal tripod.

To date the vz 59 is known to have been adopted only by the Czech army, although other nations may by now have the type in use. In the past Czech weapons have appeared wherever there is a market for small arms, and Czech weapons have thus recently turned up in the Middle East, and especially in Lebanon; some vz 52s have certainly been seen there. To date there is no record of any nation purchasing the NATO-ammunition version, but no doubt that version will turn up in some unexpected trouble spot one day.



Specification

vz 59

Calibre: 7.62 mm (0.3 in)
Weights: with bipod and light barrel 8.67 kg (19.1 lb); with tripod and heavy barrel 19.24 kg (42.42 lb)
Lengths: with light barrel 1116 mm (43.94 in); with heavy barrel 1215 mm (47.84 in); light barrel 593 mm (23.35 in); heavy barrel 693 mm (27.28 in)
Muzzle velocity: with light barrel 810 m (2,657 ft) per second, and with heavy barrel 830 m (2,723 ft) per second
Rate of fire: (cyclic) 700-800 rpm
Type of feed: 50- or 250-round belts

The Czech 7.62-mm (0.30-in) vz 59 is a development of the earlier vz 52/57, but much easier to produce. Developed with an eye to the international export market, the vz 59 has been adopted by the Czech armed forces but others crop up in various corners of the world.

Machine-Gun Tactics

The conflicting requirement for machine-guns to be portable yet capable of sustained fire led to the concept of the general-purpose machine-gun. However, in recent years the emphasis has been on specialization, heavy-barrel versions of rifles being introduced at squad level and sustained fire entrusted to such stalwarts as the Browning 0.50-calibre machine-gun.

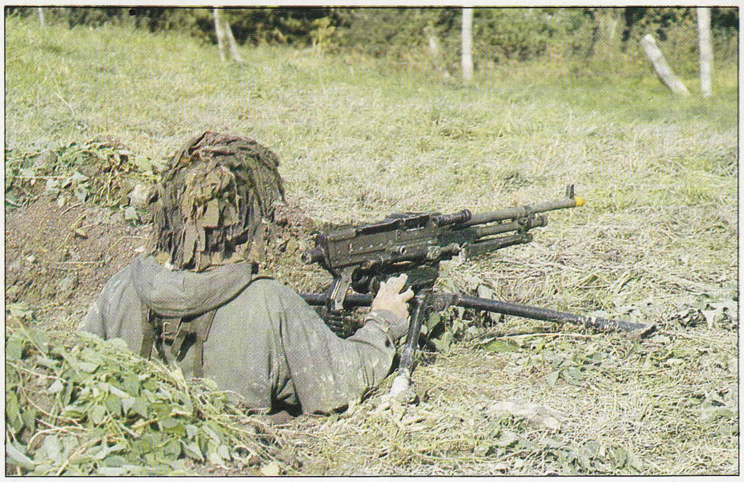
During World War I the machine-gun was a weapon that could dominate the battlefield in a manner that made movement virtually impossible, and at times during that dreadful war machine-guns were often massed in batteries which rendered whole tracts of territory impassable to men and animals. Such a dominance was not to arise again, for in the wars that followed the static conditions of the Western Front arose only infrequently. The main dominance of the battlefield passed to the artillery and tanks, and only rarely were machine-guns able to reassert their former role. Instead the machine-gun took on a new role, that of fire support for troops in attack and defence. As warfare took on a more mobile and fluid form, the machine-gun was often able to pour such volumes of fire on attacking infantry or onto a position that the enemy's tactical movement or intention became temporarily difficult or impossible.

In these mobile and fluid conditions the machine-gun often became the pivot around which an infantry unit or squad could act. By moving to a flank, a machine-gun could keep an enemy's head down while the rest of the squad moved into a favourable position or made an attack. These tactics are still widely used, though the form of the machine-gun has changed.

By the end of World War I there were two types of machine-gun. The more widely used was the heavy machine-gun (HMG), which sat on a tripod and poured out volumes of fire. Then there was the lighter and more portable light machine-gun (LMG), which could be used at lower command levels than the ponderous heavy weapon. But by the end of World War II these two types had been joined by a third, the general-purpose machine-gun (GPMG). This was a German notion that caught on fast. Very basically the idea was that one weapon could be used for both the light and the heavy roles. The GPMG was air-cooled, and thus much lighter than the water-cooled, heavy machine-guns, and when used in the HMG role the GPMG simply overcame the problem of barrel heating (produced by large volumes of fire) by means of a rapid-barrel-change capability. Spare barrels could be held close at hand and fitted in a few seconds. The same weapon could be fitted with a light bipod for producing rapid aimed fire, and was thus capable of LMG use.

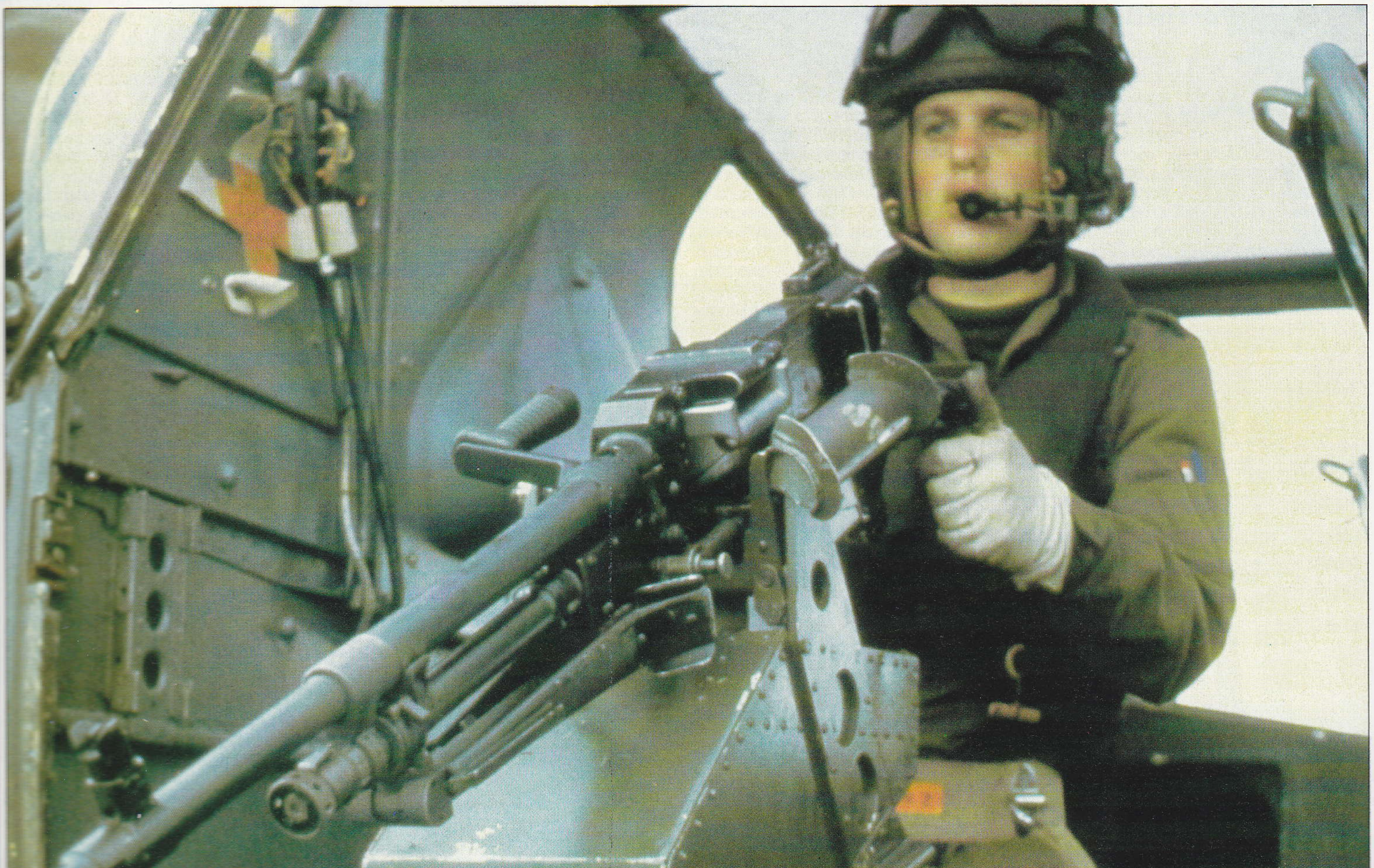
The first GPMGs were the German MG34 and MG42, the latter having the greater long-term influence to the extent that it is still in production. In the post-war period these two designs were soon joined by many others, and for a period it was GPMGs all the way. Economically the idea made good sense: only one weapon type would be needed, and with luck that basic type could be adapted for other roles outside the GPMG range, such as co-axial mountings for tank guns, helicopter guns and so on. Many of the post-war generation could indeed carry out these ancilliary roles (and do so quite happily to this day), but the soldiers soon learned that the GPMG concept has its limits.

The problem for the soldier was that while a GPMG could make a satisfactory heavy machine-gun it was less successful as a light machine-gun or squad weapon. Most GPMGs use belt-fed ammunition, and when a flapping ammunition belt is dragged through ditches and across country it creates problems for the feed, to say nothing of the task faced by the hapless carrier, who has constantly to free the thing from undergrowth and projections. The GPMG also errs on the weighty side for the squad role, and many in-service GPMGs are far heavier and more awkward to handle than they should be for such use. A simple example of this is deployment of the L7A2 (the British army's version of the FN MAG) in the squad role compared with the lighter and handier Bren Gun which it replaced: many soldiers were not happy at that transition, and remain unhappy to this day.



The British-produced version of the Belgian FN MAG is known as the L7A1 or L7A2, and is seen here with its butt removed for the sustained fire role and mounted on a buffered tripod. No feed belt is visible as it is fed in from the left-hand side of the gun from a belt box.

The L7A1 and L7A2 have been adapted for mountings firing out of the sides of Army Air Corps Lynx helicopters for providing fire support during an airborne landing. A special version for carrying in helicopter pods is known as the L20A1. Although effective, these guns are really too light for this role.



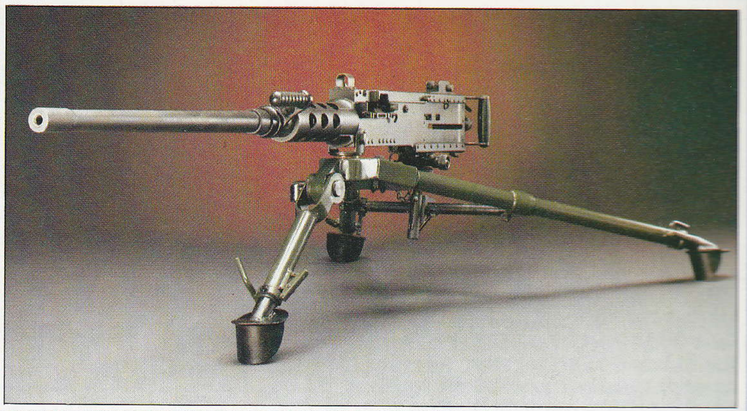
Thus there has been a move back towards the specialist LMG, and with the adoption of the new 5.56-mm (0.219-in) cartridge such LMGs can be really light yet capable of producing appreciable amounts of automatic fire. Today the LMG has returned to its original role of producing automatic fire support for the infantry squad. As these modern squads move they can produce firepower out of all proportion to their numbers from their assault rifles and squad support weapon, but it is the latter that produces the volume of accurately-aimed fire that is tactically so useful.

This move back to the LMG has not done away with the role of the HMG. There is still a place on the modern battlefield for the centrally-controlled volume fire of the heavy weapon. This is still important, for most LMGs are capable of accurate fire only to about 600 m (655 yards) at best, and HMGs often have to tackle targets or target areas at ranges well over 1000 m (1,100 yards). The current 5.56-mm rounds quite simply cannot do this, for their propellant loads are tailored to much shorter ranges. It is true that the recent Belgian SS 109 cartridge has more power at longer ranges than the American M193, but it still cannot match the power of the larger 7.62-mm (0.3-in) round in either its NATO form or the far more ancient (but still good) Soviet equivalent.

Thus the GPMG appears to be fading away as a concept, even if many of the GPMG generation live on in a support role. They will be maintained at company or battalion level and distributed as required, while the lighter weapons will be distributed at squad level. Some observers have remarked that many current light machine-guns are little more than machine rifles, i.e. rifles fitted with heavier barrels and a light bipod, and for some of the designs mentioned in this study this is true; the examples of the Soviet RPK and some of the Heckler & Koch rifles are obvious. But ideally a squad weapon has to be more than a machine rifle, especially if the squad is expected to operate in rough or difficult terrain. Under such conditions it is likely that the LMG will be the only fire support the squad can expect, and it thus has to be capable of more than short bursts of fire.

There is one factor that is now often overlooked when dealing with modern infantry tactics. Modern infantry is usually carried into action on some sort of vehicle (usually an armoured personnel carrier). Frequently the squad weapons, including the machine-guns, have to be fired from inside the vehicle, especially in patrolling and policing situations. Thus special consideration has to be given to the types of mounting the machine-gun will use, and thus to the cost of the basic weapon has to be added the expense of special mountings, be they simple pedestal mounts in Jeeps or more complex ball mountings in armoured vehicles.

But for many armed forces the image of the machine-gunner is usually that of an overloaded individual lugging about a heavy weapon and festooned with ammunition belts. Not far away is his equally loaded assistant carrying more belts, spare barrels and all his own gear. Contrast this with the future ideal of a heavy support weapon carried on an armoured vehicle, with the squad equivalent carrying a weapon weighing only a little more than the squad's standard rifles. For some armies this is already becoming a reality. The example of the Enfield Weapon System, with the IW and the LSW working closely together and swapping ammunition magazines when required, is to be seen in the British army in the near future. They will not be alone, for the Red Army has been using the AKM/RPK combination for years and the US Army will soon have the M249 Minimi/M16A1 mix. When that happens the M60s, FN MAGs, L7A2s and all the other cumbersome weapons will go back to the heavy support role, and the front-line soldier will be happy at the prospect.

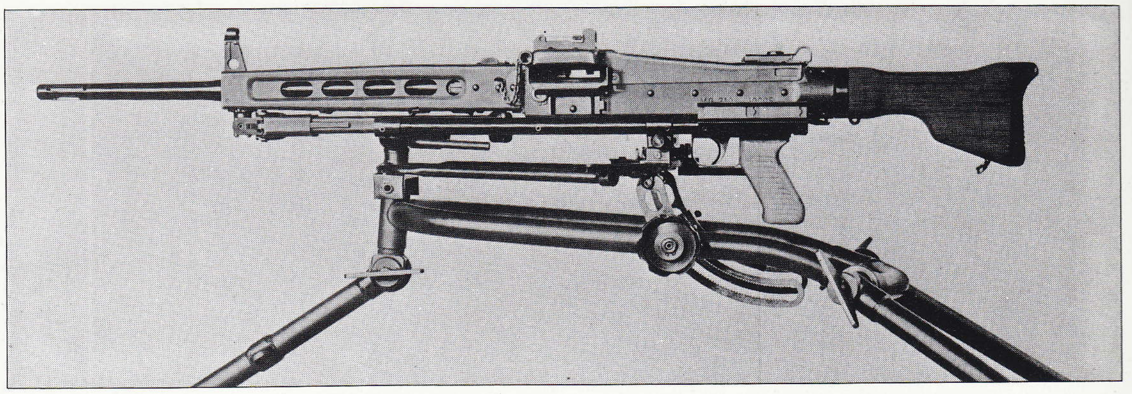


No GPMG can equal the range and stopping power of the heavy-calibre machine-guns. Many countries use the Browning 0.50-calibre in the sustained-fire role. This is the M2 HB version produced by FN, which features a quick barrel change.

Spent cases are seen in flight as they are ejected from the M60's feed mechanism. The M60 uses a mechanism based on the German World War II MG42 allied with some other features derived from the German FG42, also of the war period. The M60 is gas-operated and is the first of its kind to be used by the US armed forces.

SWITZERLAND

7.62-mm SIG 710-3



The 7.62-mm (0.30-in) SIG 710-3 general-purpose machine-gun was based on German wartime design experience and should have emerged as one of the finest machine-gun designs ever, but in the event only small numbers were produced.

The Swiss 7.62-mm (0.3-in) **SIG 710-3** is a weapon that on paper appears to be one of the finest of its class. The overall design, construction and reliability of the SIG design is such that it would appear to be a world leader. In fact nothing of the kind has occurred, for this most promising of machine-gun designs has now been taken out of production, and around the world it can be found in service with nations such as Brunei, Bolivia and Chile.

The reason for this strange state of affairs can perhaps be seen in the fact that when the Swiss produce any weapon design they do so in a manner that can only attract superlatives. The Swiss produce weapons with a magnificent degree of care and attention to finish, and while people may be willing to pay heavily for similarly-engineered Swiss watches, they are not willing to pay on the same scale for machine-guns. The SIG products tend to be expensive, and in a world where machine-guns can be produced on simple machine tools and metal stamping jigs the finely machined weapon has little chance of commercial success.

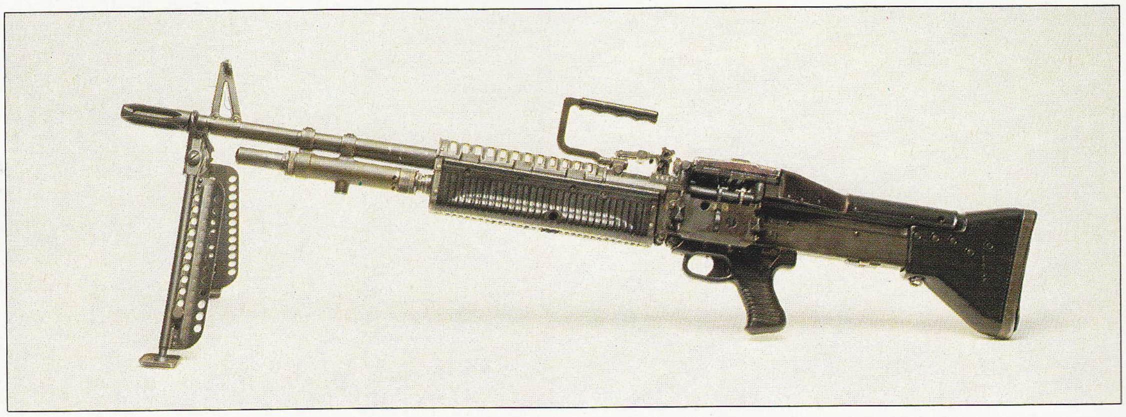
The SIG 710-3 is actually the third in a series of machine-guns, the first of which were produced during the early post-war years. In simple terms the first SIG 710 models were machine-gun versions of the Swiss Sturmgewehr Modell 57 (assault rifle model 1957), and the machine-gun employs the same delayed roller and block locking system as the CETME and the Heckler & Koch rifles. On the Swiss weapons the system constitutes a form of delayed blowback, with the chamber fluted to prevent spent cases 'sticking'. The first SIG 710s were virtually hand-made weapons that attracted much attention (but few orders), so an increasing number of production expedients was incorporated into the design, to the point where the SIG 710-3 makes use of some stampings; needless to say, these are of very high quality. The machine-gun sports some features from German weapons. The Swiss were very influenced by the MG42 and in the years after the war produced several designs based on features of the model. The SIG 710-3 trigger mechanism is the same as that of the MG42, and so is the ammunition feed which is so efficient that it accommodates both American and German belt linkings without trouble. The locking system is identical with that employed on the Sturmgewehr 45 which failed to reach service with the German army before the surrender of May 1945.

But the SIG 710-3 does have many original Swiss features, not the least of which is the type of rapid barrel change. Many extras were developed for these machine-guns, including one buffered tripod for sustained fire. Special features such as dial sights and telescopic sights were also produced, and in the end the SIG 710-3 could be regarded as one of the most advanced machine-guns available anywhere. But it was all for nothing as far as SIG was concerned, high development and production costs (combined with the strict rules of the Swiss government regarding arms sales) leading to an early exit from production.

Specification
SIG 710-3
Calibre: 7.62 mm (0.3 in)
Weights: gun 9.25 kg (20.39 lb); heavy barrel 2.5 kg (5.51 lb); light barrel 2.04 kg (4.5 lb)
Lengths: gun 1143 mm (45 in); barrel 559 mm (22 in)
Muzzle velocity: 790 m (2,592 ft) per second
Rate of fire: (cyclic) 800-950 rpm
Type of feed: belt

USA

7.62-mm M60



The American M60 is a rather bulky and heavy weapon that is awkward to handle. First produced in the late 1940s, it underwent a protracted development programme before it entered service in the late 1950s, and has been widely used ever since. It is now a reliable and efficient weapon used by several armies.

The **M60** is a general-purpose machine-gun that can trace its origins back to the latter period of World War II, when it was known as the **T44**. The design was greatly influenced by the new German machine-gun designs: the ammunition feed is a direct lift from the MG42, and the piston and bolt assembly was copied from the revolutionary 7.92-mm (0.312-in) Fallschirmjägergewehr 42 (FG42). The T44 and its production version, the M60, made extensive use of steel stampings and plastics, and the first examples were issued for service with the US Army during the late 1950s.

These first examples were not a success. They handled badly and some of the detail design was such that changing a barrel involved taking half the weapon apart. These early difficulties were gradually eliminated, and the M60 is now as efficient a weapon as any, but many serving soldiers still profess not to like the weapon for its generally awkward handling properties. But the M60 is the US Army's first general-purpose machine-gun, and it now serves in a host of roles.

In its basic form as a squad support weapon, the M60 is fitted with a stamped steel bipod mounted just behind the muzzle. For this purpose it is carried by a small handle which is rather flimsy for the loads placed on it; moreover the point of balance of the handle is entirely wrong. Instead many soldiers prefer to use a sling, and the weapon is often fired on the move while being steadied by the sling. For the light machine-gun role the M60 is a bit hefty, but it will be replaced in the near future by the 5.56-mm (0.219-in) M249 Minimi for the US Army. For heavier use the M60 can be mounted on a tripod or on a vehicle pedestal mount.

Some special versions of the M60 have been produced. The **M60C** is a remotely-fired version for external mounting on helicopters. The **M60D** is a pintle-mounted version with no butt for mounting in helicopter gunships and some vehicles. The **M60E2** is a much-altered variant for use as a co-axial gun on armoured vehicles.

Throughout much of its production life the M60 has been manufactured by the Saco Defense Systems Division of the Maremount Corporation, which was always aware of the shortcomings of the M60's design, especially in the light machine-gun role. Accordingly the company has now produced what it calls the **Maremount Lightweight Machine-Gun**, which is the M60 much modified to reduce weight and improve handling. The bipod has been moved back under the receiver and a foregrip has been added. The gas-operated mechanism has been simplified, and there is now provision for a winter trigger. The result is a much lighter and handier weapon than the original, although it can now be used only for the light machine-gun role. The new weapon is currently undergoing evaluation trials by several armies.

The M60 is now in service with several armies other than the US Army. Taiwan not only uses the M60 but produces it as well. South Korea is another Asian operator, while farther south the Australian army also has the M60 in service.

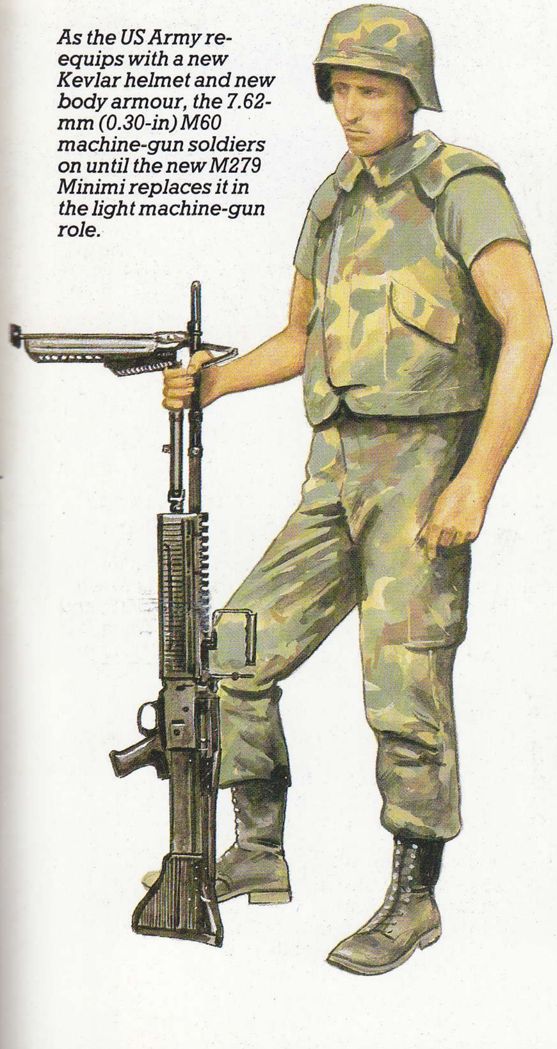
Specification
M60
Calibre: 7.62 mm (0.3 in)
Weights: gun 10.51 kg (23.17 lb); barrel 3.74 kg (8.245 lb)
Lengths: gun overall 1105 mm (43.5 in); barrel 559 mm (22 in)
Muzzle velocity: 855 m (2,805 ft) per second
Rate of fire: (cyclic) 550 rpm
Type of feed: 50-round belt

'Busting Caps'- The M60 in Vietnam

In the desperate close-range actions against the Viet Cong, the M60 machine-gun teams had to achieve fire superiority over a well-armed and skilful enemy – no easy task with a complicated and sometimes temperamental weapon.

In 1884, the prototype Maxim machine-gun (water-cooled) weighed 27.2 kg (60 lb) and fired an 11.43-mm (0.45-in) bullet at the rate of 600 rounds per minute. In 1984, the M60 machine-gun (air-cooled) weighs 10.4 kg (23 lb) and fires a 7.62-mm (0.3-in) bullet also at the rate of 600 rounds per minute. Add the tripod, and you have a total weight of 23.6 kg (52 lb).

The main difference between the two are, of course, accuracy and reliability; but the tactical use (particularly in the US Army) remains the same: the machine-gun is primarily a static defensive weapon, only offensively used to provide fire-support for advancing infantry. In the case of the M60, this has as much to do with the United States' strategic doctrine as to tactics: the USA is perceived only as fighting a defensive war (as in the instance of NATO forces facing a Warsaw Pact advance), and overall, the USA relies on firepower over flexibility and manoeuvrability.



As the US Army re-equips with a new Kevlar helmet and new body armour, the 7.62-mm (0.30-in) M60 machine-gun soldiers on until the new M279 Minimi replaces it in the light machine-gun role.

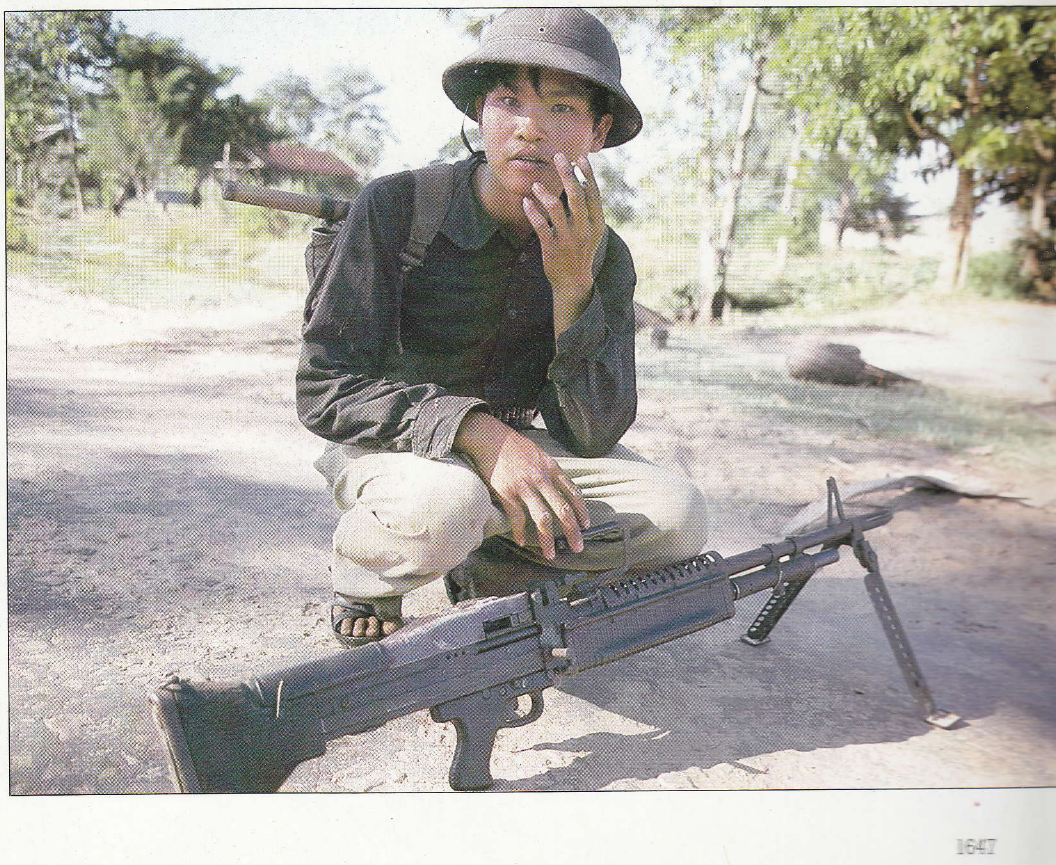
If nothing else, Vietnam showed that the best defence can often be attack, and that flexibility can be as important as firepower. Nonetheless it is best to forget the idea of the M60 being fired from the hip as film-makers would have it: even though the M60 is exceptionally well balanced, after only four rounds on automatic it will pull high and to the right.

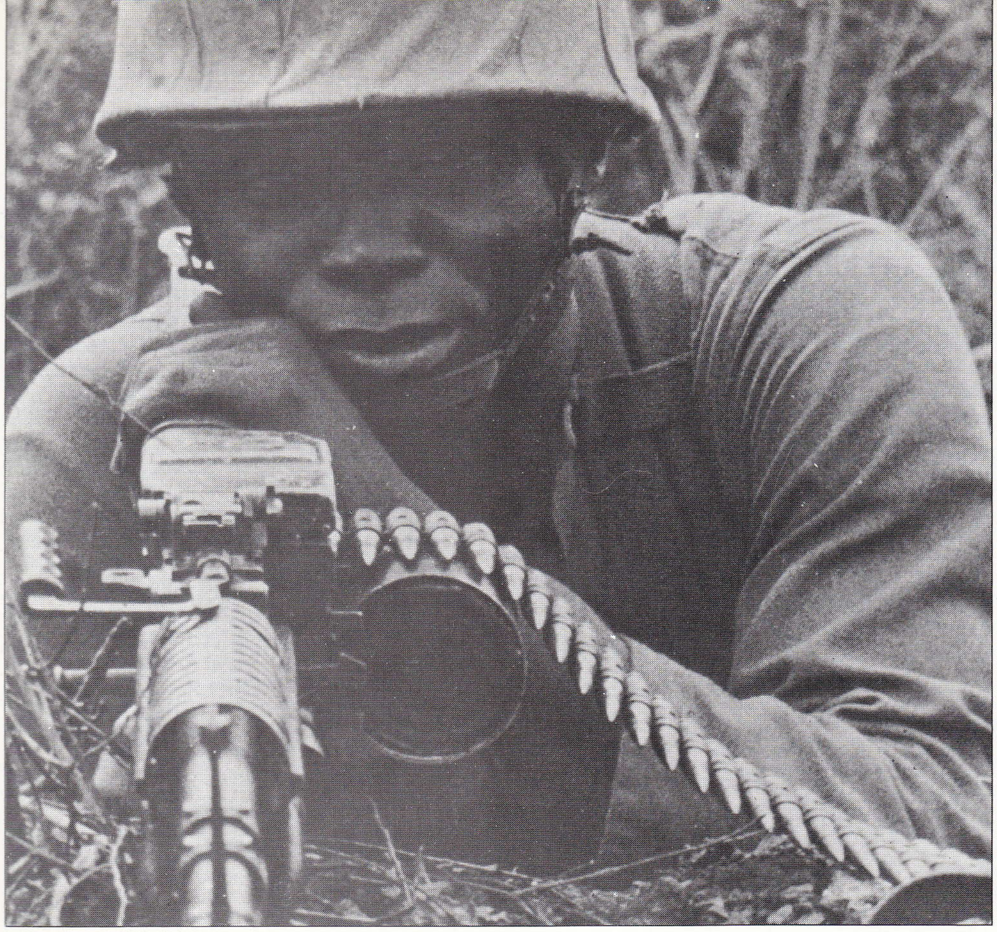
As in all weapon systems, there is a distinct gap between the theory and practice of firing the M60. Instructors may (often do) wax lyrical about Dangerous Space (the distance a round or burst remains at a man's height above the ground); Cones of Fire (shot dispersal around lines of fire); and the Beaten Zone (pattern of descending shots). But the M60 machine-gunner in the US Army (or any machine-gunner, for that matter) is interested in accuracy, reliability, maintenance, how easy it is to fire and how easy it is to carry. For its size, the M60 scores well on all points, as well it might, because it owes much of its design to the famous German World War II machine-gun, the MG42, an updated version of which is still in service with the West German army as the MG3. So, remembering that no comparisons with British Bren, LMG or possibly even the GPMG should be made, we should now take a look at the M60 in action. And where else to look but the M60 in Vietnam.

A rifle company has harboured up for the night. With two M60s per platoon (three or four platoons per company) plus at least a couple more M60s belonging to company HQ, plus the 12.7-mm (0.5-in) machine-guns that have been dismounted from the personnel carriers, plus mortars, plus rockets, you can begin to understand why a modern rifle company is said to have a fire power equal to a World War I infantry brigade. If you are the M60 gunner, you will have made sure that your weapon is firmly positioned; that means either using the tripod or resting the barrel on tree trunks or sandbags. If you are firing through a ground-level embrasure, you may be using the attached bipod; but you would prefer not to, because that means you have to use your left hand to hold the butt into the ground when firing on automatic, and that increases the risk of getting your shoulder into too close contact with the butt end, which could mean at best a very nasty bruising, at worst a dislocated shoulder. More to the point, unless you are a 'natural' machine-gunner, it will play all sorts of hell with your accuracy when you are firing on automatic. And as you do not expect to fire on single shot, you will definitely need to be well planted. You have loaded with ball ammunition, with tracer in reserve. In the daytime you might have both incendiary and spotter ammunition in reserve, but you certainly would not need armour-piercing: if the enemy do have any AFVs, they keep them well hidden.

As an M60 gunner, you have an E4 specialist rating. It is not a command rank, but it does put you firmly in charge of (i.e. responsible for) the gun; you are the head man of the three-man crew the M60 requires. In fact, you are not expecting to be called tonight; there are no heavy enemy troop concentrations in the area, so the most you can expect is a sniper, or a few rounds of mortar fire or possibly an artillery barrage. And there will not be very much that you can do about those, at least in your present position.

M60s are still encountered in South East Asia; many were handed over to pro-American local forces, while many more were captured by various guerrilla and other forces. This example was photographed in North Vietnam in 1975.





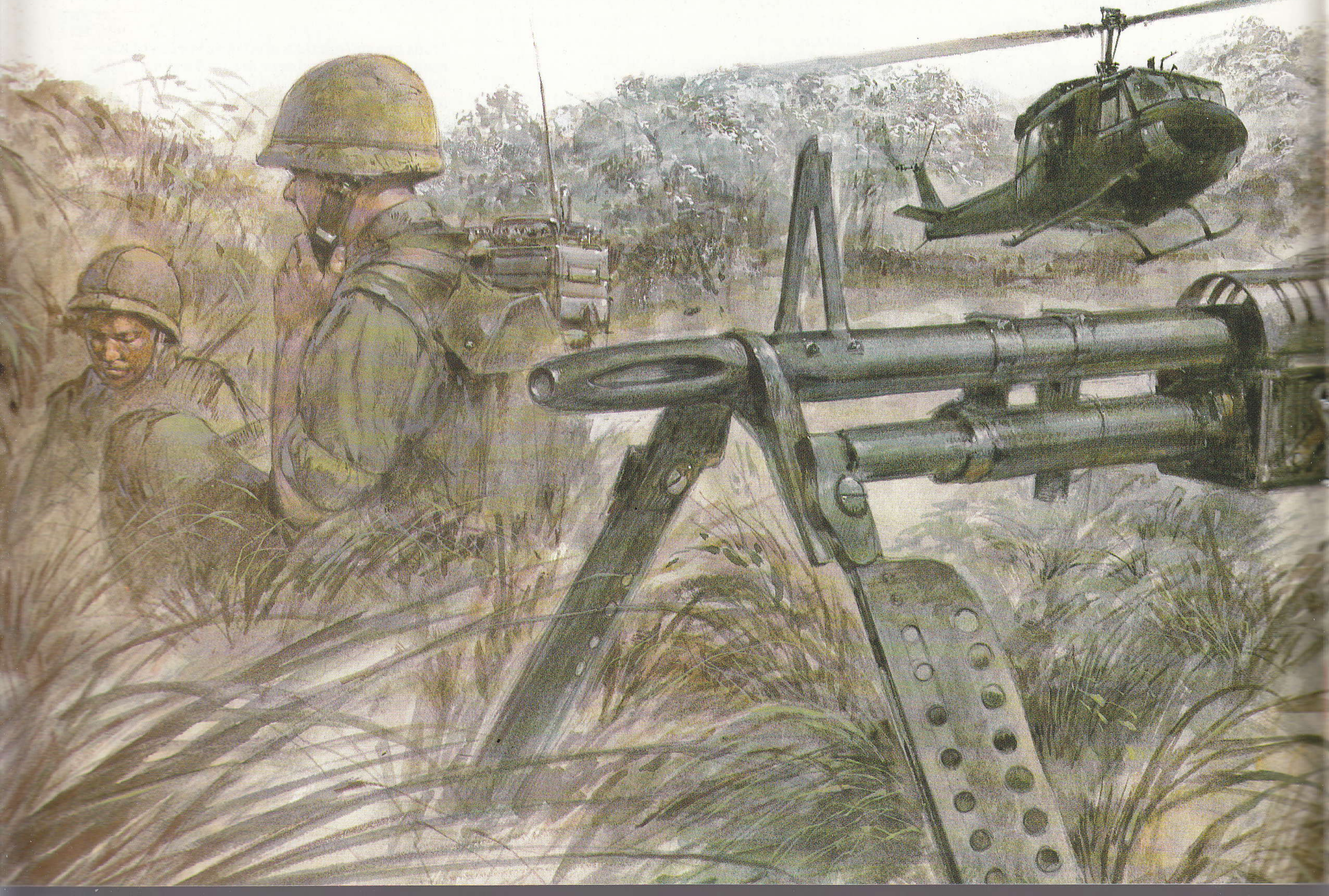
Above: A Vietnam M60 is seen in action with an improvised addition to the ammunition feed to ensure a trouble-free entry of the belt into the weapon. Snagged or twisted belts could often cause jams at the most difficult moments, and it was normal for one man to watch the feed at all times to avoid troubles.

Like soldiers the world over, you have managed to make yourself reasonably comfortable . . . until your sergeant walks over to tell you that your squad is going out on ambush tonight and would you (please) be ready to move out in 20 minutes.

The first thing you do is check your weapon. Never mind that you checked it only that afternoon; if it breaks down in a company strongpoint, at least there are a minimum of seven other M60s (not to mention the 12.7-mm/0.5-in M2s) to take up the slack while you site a new weapon. On this ambush there will only be one M60 because at night, in the jungle, two M60s will get in each other's way, probably end up shooting their own troops. Your number two carries the spare parts and cleaning kit, and although everything checks out OK, you decide to change the barrel. It only takes two seconds (you once did it in 1.5 in training) and it is not as if you are being wasteful, because your number two always has at least three spare barrels with him. Twenty minutes later, and you are ready to move out.

Your M60 (or 'pig' as you have come to call it) is slung around your neck and shoulders. Spare

***Below:** The M60 was known as 'the Pig' to the men who had to lug it through the jungle, but it provided the squad with tremendous firepower. Shooting in combat was dubbed 'busting caps', a derisive reference to playing with cap guns as children.*

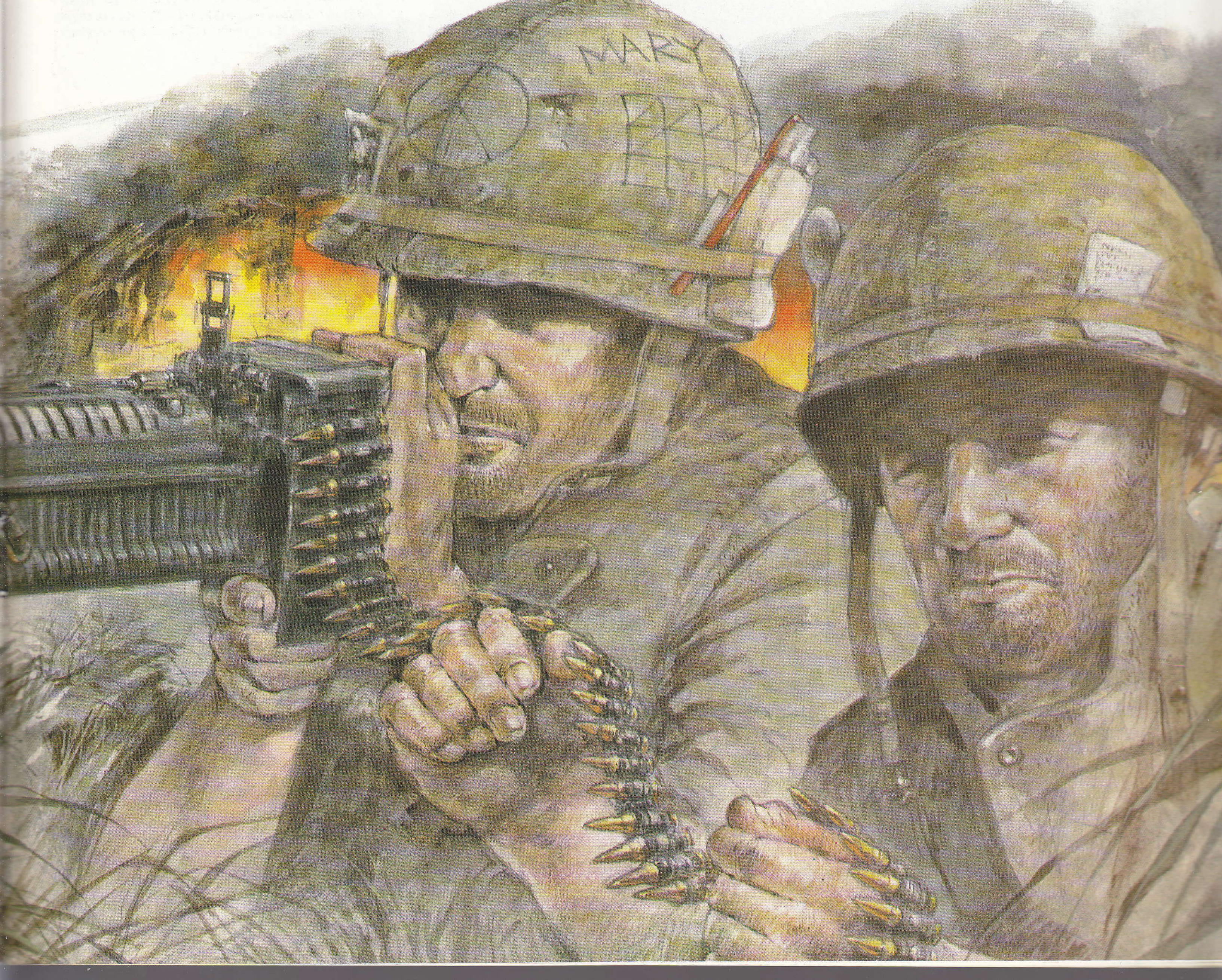


bands of ammunition also criss-cross your shoulders, and you are carrying a box of ammunition in your left hand. Your number two (a private first class) is carrying a box in each hand, plus one on his shoulders, plus spare parts and the cleaning kit. Your number three (a private) is carrying the tripod (it weighs 3 kg/6.7 lb) and even more ammunition than your number two. Tonight the sergeant has decreed that all other squad members will also carry spare ammunition for the M60 (no wonder they call it a 'pig') and it will be our number three's job to make sure the spare ammunition is centralized and available when you need it.

Moving through the night, the two places you do not walk are point and rear. As far as possible, your squad will provide a shield for you until you are in position; you carry the major firepower, and are thus the most vulnerable to a sniper's bullet. The track your squad is following runs through dense primary jungle. It is supposedly clear of mines and booby traps, because the enemy uses it for a courier and supply route; even so, possibly you reflect that one of the good points about being high on a sniper's target list is that someone else is liable to step on a mine before you do. So long as you keep in single file, that is, and make sure to follow the steps of the man in front ... not always easy to do at night in the jungle.

Your sergeant signals that you have reached the ambush point, and indicates to you where to set up. The team swings into action. Normally, it takes less than one minute to be ready to fire from the moment the tripod hits the ground. But tonight, as you will be firing down the track, towards the approaching enemy (no point in firing from the side of the track because you would be too close to get in a proper burst), your weapon has to be clamped on a fixed line of fire otherwise you might end up spraying your own squad. Now, with your weapon fixed, ammunition stacked around you, your number two beside you, everyone and everything camouflaged up, you sit behind your 'pig' and wait. And wait. And wait. And you are probably still waiting when dawn breaks ... unless, just for once, intelligence was 100 per cent accurate and the enemy did appear.

***Right:** During the Vietnam War the M60 became a virtual symbol of the American presence in the conflict, as cameramen tended to become attracted by the military and aggressive appearance of the weapon. It was widely used in Vietnam, as its high rate of fire was used as a counter to the elusive guerrilla targets.*



'Busting Caps' – The M60 in Vietnam

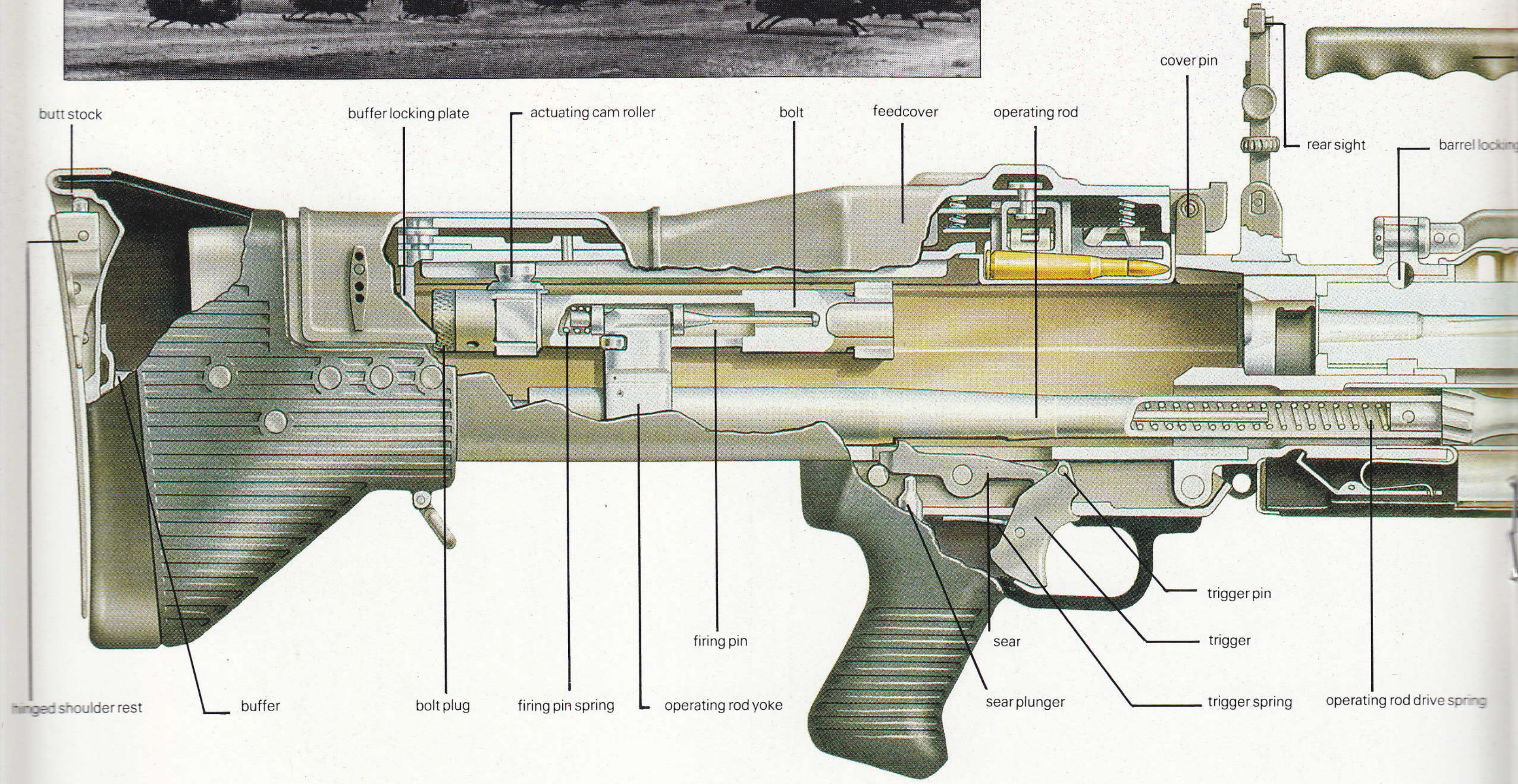
Assuming they did, the firefight would probably have been over very quickly. First, your weapon has an effective range of up to 1000 m (1,100 yards, which means that at 100 m (110 yards) it is one of the most effective weapons available, with a stopping power that is close to being awesome; and second, no one stays around for too long when they are facing the wrong end of an M60. While most armies teach an Immediate Action drill on being ambushed that entails charging through the ambushing enemy, it is a very brave, lucky or foolhardy soldier that manages to charge any machine-gun . . . and lives to tell the tale.

So, if intelligence has been correct, the firefight has probably lasted less than a minute before the enemy have been killed, captured or have simply melted away into the surrounding darkness. And if that has happened, you wonder (not for the first time) why so much spare ammunition is always carried. The answer is simple. Your weapon is the principal, indeed the only, weapon capable of providing fire support for your squad. Your role is not simply to kill the enemy but to save the lives of your fellow soldiers. That means covering fire, when you try to make the enemy keep their heads down and think twice about chasing after you or even firing back. And covering fire expends an enormous amount of ammunition because often you do not have a firm target.

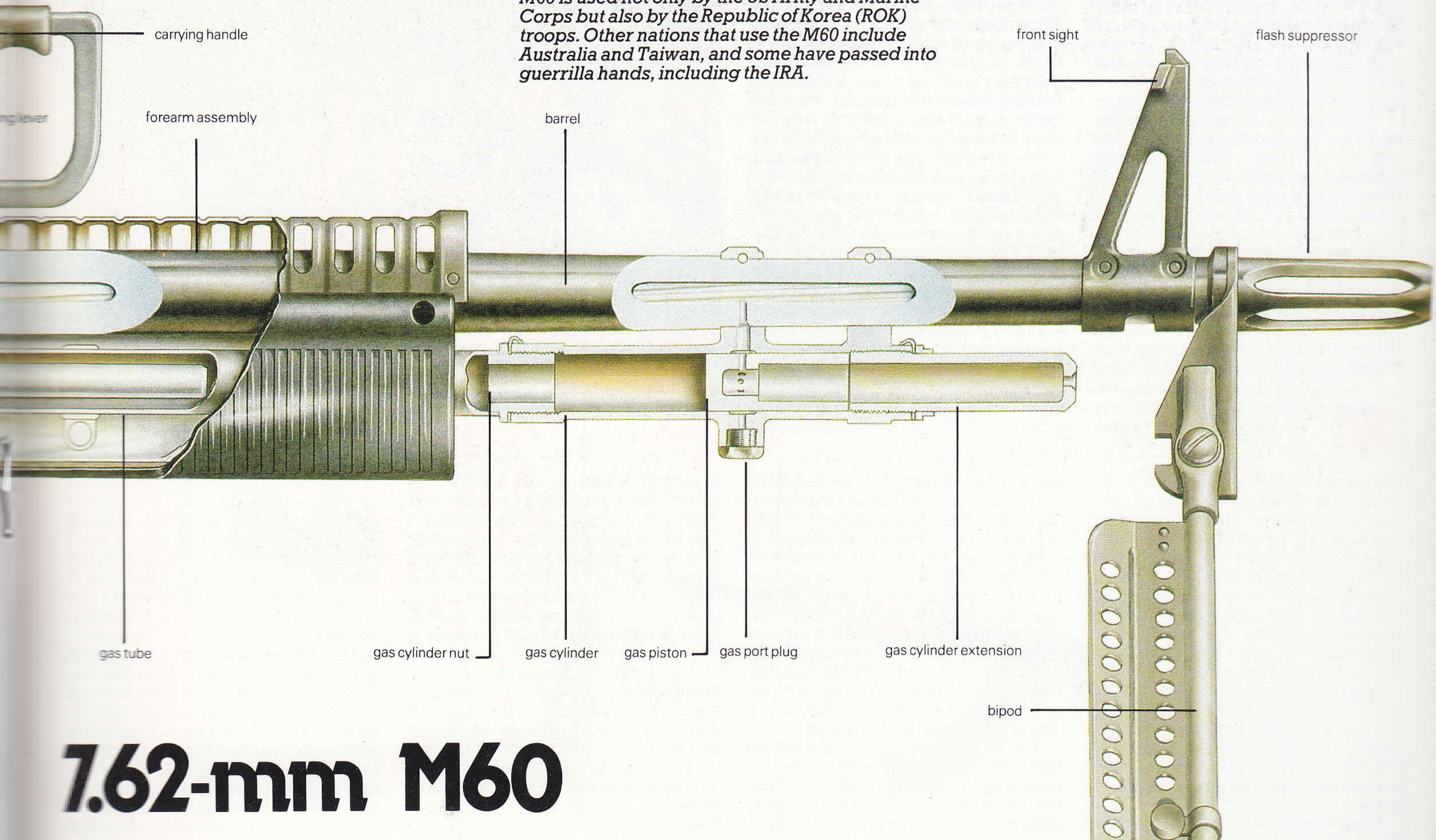
So, whether successful or not, your squad makes its way back to base. This has probably been the last ambush you will go on, because you are due for a transfer to helicopter gunner. Probably 'someone' has noticed how accurate you are, and firing an M60 from a Huey needs accuracy. In fact, when the M60 was first used on 'choppers', it was attached to the skids, which meant it could only fire in the direction the chopper was pointing. But now it is mounted on a pintle by the door that allows you three-way movement; you will soon learn at training school how to use that movement to compensate for the movement of the Huey.

Whatever happens, you seem destined to stay an M60 gunner, unless you are promoted away from it. You might call it a 'pig', but it is more accurate and more comforting than an M16. In fact, it is as accurate as the old M1 rifle; old soldiers in the US army talk about that weapon in the same way as their British counterparts talk about the Lee Enfield.

***Left:** The machine-guns carried on these Bell UH-1Ds were special versions of the M60, known as the M60D. The M60D was mounted on a pintle and had no butt, and used a special accessory on the feed mechanism. It was widely used in Vietnam for area suppression fire and many M60Ds were mounted on the exterior of vehicles.*



Above: An M60 light machine-gun team in action during troop exercises in South Korea, where the M60 is used not only by the US Army and Marine Corps but also by the Republic of Korea (ROK) troops. Other nations that use the M60 include Australia and Taiwan, and some have passed into guerrilla hands, including the IRA.


carrying handle
ng lever
forearm assembly
barrel
front sight
flash suppressor
gas tube
gas cylinder nut
gas cylinder
gas piston
gas port plug
gas cylinder extension
bipod

7.62-mm M60

SINGAPORE

5.56-mm CIS Ultimax 100

The relatively small nation of Singapore has in recent years become a major member of the international defence matériel market. Starting from virtually nothing, Singapore has rapidly built up a defence manufacturing industry and among recent products has been a light machine-gun called the **CIS Ultimax 100** or 3U-100.

The Ultimax 100 can trace its origins back to 1978. To provide a framework in which to work, the newly-formed Chartered Industries of Singapore (CIS) had obtained a licence to produce the 5.56-mm (0.219-in) Armalite AR-18 and also the Colt M16A1 rifles. Using these two weapons as a basis, CIS decided to build in some ideas of their own and the Ultimax 100 was the result. Some of the early prototypes were less than successful, but diligence and the application of some sound engineering removed the early problems, and the Ultimax 100 is now regarded as one of the best weapons in its class.

The Ultimax 100 fires the M193 5.56-mm cartridge, although there is no reason why it could not be converted to fire the new SS 109. It is a light machine-gun that is really light, for CIS was understandably keen to produce a weapon suited to the relatively light-statured personnel found in the Asian world. The result is that the Ultimax 100 handles very like an assault rifle. CIS has taken great pains to reduce recoil forces to a minimum, and has even introduced a feature it calls 'constant recoil'. With this feature the breech block does not use the back-plate of the receiver as a buffer, as is normal in many similar designs: instead a system of springs absorbs the forces and the result is a weapon that can be handled with ease and smoothness. The Ultimax 100 can be fired from the shoulder with no problems at all.

The likeness to an assault rifle is carried over to the ammunition feed. The Ultimax 100 uses a 100-round drum magazine under the body that can be changed with the same facility as a conventional box magazine. The drum magazines can be carried in a special webbing carrier. For firing on the move a forward grip is provided, and to make the weapon even handier the butt may be removed. For more accurate firing a bipod is a fixture and the barrel change is rapid and easy. If required normal M16A1 20- or 30-round box magazines can be used in place of the drum.

Already accessories for the Ultimax 100 abound. Perhaps the most unusual of them is a silencer which is used in conjunction with a special barrel. More orthodox items include a special twin mounting in which two weapons are secured on their sides with the drum magazines pointing outwards. One very unusual extra is a bayonet, a feature which few similar weapons possess. Rifle grenades can be fired from the muzzle without preparation.

To date the Ultimax 100 is available in two versions; the **Ultimax 100 Mk 2** with a fixed barrel and the **Ultimax 100 Mk 3** with the easily-changed barrel. More versions are certain, for the Ultimax 100 has a most promising future. It is already in service with the Singapore armed forces and many more nations are showing a great interest in the weapon. It is certainly one of the handiest and most attractive of the 5.56-mm light machine-guns.

The Ultimax 100 Mark 3 light machine-gun is a small and light weapon that is ideally suited for many South East Asian armed forces. It is light and easy to handle and after a period of development is now a reliable and efficient weapon. It is now in full-scale production in Singapore.

Specification

Ultimax 100

Calibre: 5.56 mm (0.219 in)

Weights: gun empty 4.7 kg (10.36 lb); loaded with 100-round drum 6.5 kg (14.33 lb)

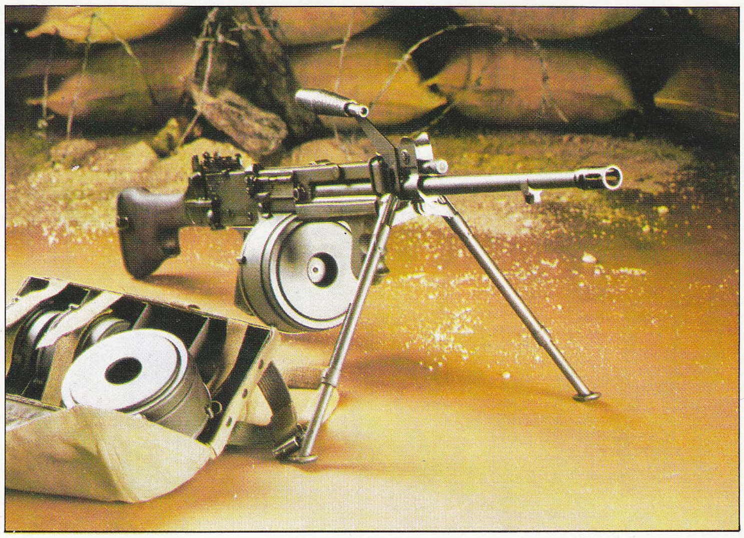
Lengths: overall 1030 mm (40.55 in); barrel 508 mm (20 in)

Muzzle velocity: (M193) 990 m (3,248 ft) per second

Rate of fire: (cyclic) 400-600 rpm

Type of feed: 100-round drum, or 20- or 30-round box magazine

Below: The Ultimax 100 uses a drum magazine holding 100 5.56-mm (0.219-in) rounds. It can also use 20- or 30-round box magazines. The full 100-round drum can be fitted in only 11.6 seconds, but more drums can be carried in the special carrier shown here. A bayonet can be fitted and a silencer is available.



USSR

7.62-mm PK

One very noticeable feature in Soviet small-arms design is the strange mixture of innovation and conservatism that seems to beset every generation of weapons. Despite the impact made by the then-novel 7.62-mm (0.3-in)×39 cartridge used in the AK-47 assault rifle family, Soviet machine-guns have continued to use the much more powerful 7.62-mm×54R cartridge, which retains a distinct rim at its base. This rim was originally used for extraction from the old Mosin-Nagant rifles that can be traced back to 1895, if not before, but the same round is used for the Red Army's current general-purpose machine-gun known as the **PK** series.

There are several members of the PK range. The PK is the basic gun with a heavy barrel marked by flutes along its exterior. This was first seen in 1946, and since then the **IKM** has arrived on the scene; this is an improved version of the PK that is lighter and simpler in construction. The **PKS** is a PK mounted on a tripod which can be used for anti-aircraft as well as ground fire. The **PKT** is a version for use on armoured vehicles, while the **PKM** is a PK mounted on a bipod. When the PKM is mounted on a tripod it becomes the **PKMS**. The **PKB** has the usual butt and trigger mechanism replaced by spade grips and a 'butterfly' trigger arrangement.

The PK appears to be all things to all men, and as far as the Red Army is concerned it is a true multi-role type: the PK is used in roles ranging from infantry squad support to AFV use in special mountings. All the PK machine-guns operate on the same principle, based on the Kalashnikov rotary-bolt system used in many other current Soviet weapons. The interior of the PK is populated by surprisingly few parts: there are just the bolt/breech block, a piston and a few springs. The ammunition feed makes up a few more parts, and that is about it. Thus the PK has few parts to break or jam and it is very reliable. When used in the light machine-gun role the ammunition is normally carried in a metal box slung under the gun. For tripod operation variable lengths of belt are used. In the sustained-fire role the barrel has to be changed at regular intervals even though it is chromium-plated to reduce wear (a common Soviet practice).

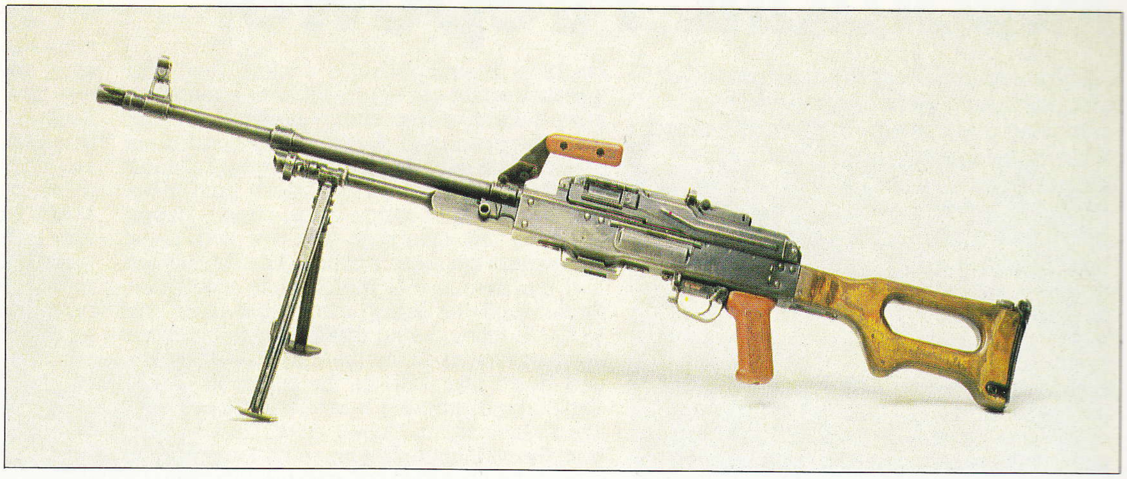
These PK weapons must rank among the most numerous of all modern machine-guns. They are used not only throughout the Red Army but also by many members of the Warsaw Pact. The Chinese produce a copy known as the **Type 80**. Both the PK and the Type 80 have been passed on to many nations in the third world and some are now in the hands of 'freedom fighters'.

The one odd thing regarding the PK series is the retention of the old rimmed 7.62-mm cartridge. Even the conservative British discarded their beloved 7.7-mm (0.303-in) cartridge decades ago, but the Soviets appear to be more conservative still. Thus there originated the odd alliance of the superb PK machine-gun with all its many fine points and a cartridge that was developed during the 1890s.

Specification

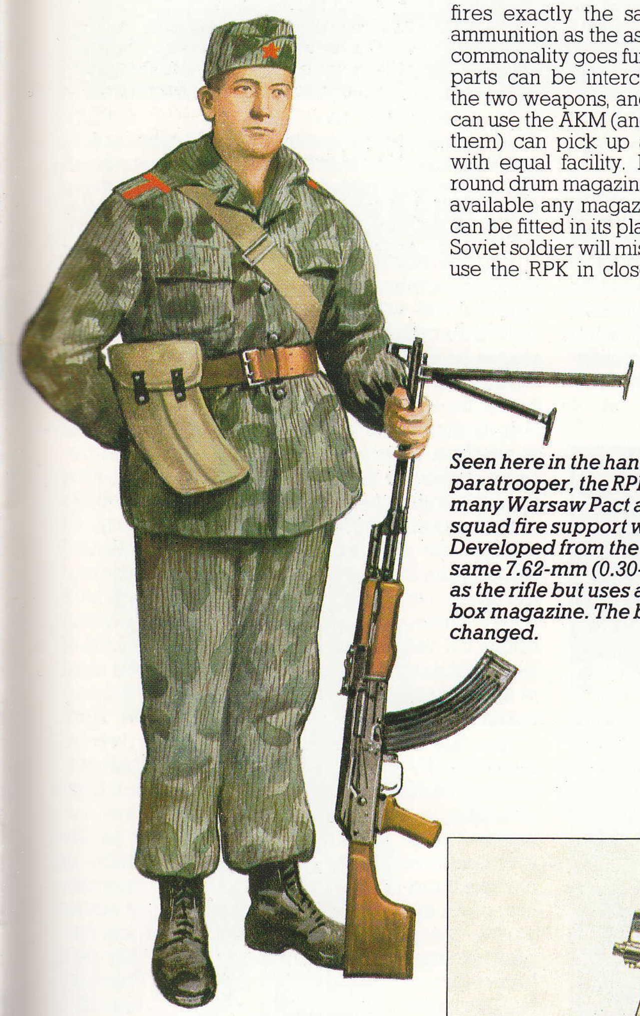
PK
Calibre: 7.62 mm (0.3 in)
Weights: gun empty 9 kg (19.84 lb); tripod 7.5 kg (16.53 lb); 100-round belt 2.44 kg (5.38 lb)
Lengths: gun 1160 mm (45.67 in); barrel 658 mm (25.91 in)
Muzzle velocity: 825 m (2,707 ft) per second
Rate of fire: (cyclic) 690-720 rpm
Type of feed: 100-, 200- and 250-round belts

The Soviet 7.62-mm (0.30-in) PK machine-gun is seen here in its light machine-gun form as the PKM. It is a simple and sturdy weapon with few moving parts, and is widely used by many Warsaw Pact armed forces and other forces around the world.



USSR

7.62-mm RPK



Seen here in the hands of a Bulgarian paratrooper, the RPK is used by many Warsaw Pact armies as a squad fire support weapon. Developed from the AKM, it fires the same 7.62-mm (0.30-in) ammunition as the rifle but uses a larger 40-round box magazine. The barrel cannot be changed.

Whereas the Red Army uses the PK series as a general-purpose machine-gun, the 7.62-mm (0.3-in) **RPK** is very much a light machine-gun used for squad support. The RPK was first noted in 1966 and it may be regarded as an enlarged version of the AKM assault rifle. It has a longer and heavier barrel than the AKM, plus a light bipod, but otherwise the RPK is the same weapon as the AKM.

This commonality of weapons makes a great deal of sense. The AKM fires exactly the same 7.62-mm×39 ammunition as the assault rifle, but the commonality goes further. Some spare parts can be interchanged between the two weapons, and any soldier who can use the AKM (and that means all of them) can pick up and fire the RPK with equal facility. If the special 75-round drum magazine of the RPK is not available any magazine from an AKM can be fitted in its place. One thing the Soviet soldier will miss if he ever has to use the RPK in close action is that it does not have a mounting bracket for a bayonet.

Considering that the weapon is intended as a light machine-gun, it is surprising that the RPK does not have provision for changing the barrel when it gets hot. In order to ensure the barrel does not overheat, recruits are trained to limit burst-firing to about 80 shots per minute. For most tactical purposes this will be more than adequate, but there must be times when this fire rate will have its disadvantages. Apart from the 75-round drum already mentioned, there are curved box magazines holding 30 or 40 rounds. Some RPKs have been seen with infra-red night sights. A copy produced by the Chinese is known as the **Type 74**.

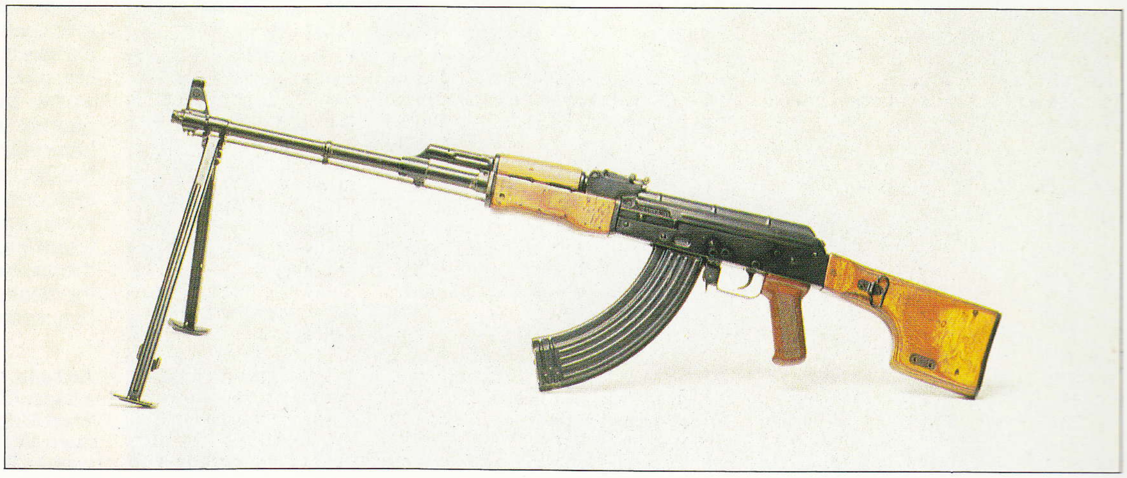
In recent years the Red Army has changed its standard rifle calibre to the new 5.45-mm (0.2146-in)×18 cartridge. For this round the AK-74 rifle was developed, and it follows that a new version of the RPK would follow. It has now appeared as the **RPK-74**. Apart from the scaling down of some parts to suit the smaller calibre, the RPK-74 is in overall terms identical with the RPK.

The RPK appears to be a popular weapon with the Red Army and the many Warsaw Pact nations to which it has been delivered. The type appears to be produced in East Germany and as far as can be determined the RPK is still in production in the Soviet Union (and China). It has been handed out to some nations sympathetic to the Soviet way of thinking, and needless to say the RPK has found its way into the hands of many 'freedom fighters'. RPKs were observed during the recent fighting in Lebanon and more have been seen in action in Angola. Despite its rate-of-fire limitations, the RPK will no doubt be around for many years to come, and the Red Army still retains huge numbers of the type despite the introduction of the RPK-74.

Specification

RPK
Calibre: 7.62 mm (0.3 in)
Weights: gun 5 kg (11.02 lb); 75-round drum 2.1 kg (4.63 lb)
Lengths: gun 1035 mm (40.75 in); barrel 591 mm (23.27 in)
Muzzle velocity: 732 m (2,402 ft) per second
Rate of fire: (cyclic) 660 rpm and (practical) 80 rpm
Type of feed: 75-round drum, or 30- and 40-round box magazines

The Soviet RPK is the standard Warsaw Pact squad fire support weapon. It does not have an interchangeable barrel and so is not capable of sustained fire. The design may be regarded as a development of the AKM assault rifle, and it fires the same 7.62-mm (0.30-in) ammunition. A Chinese version is known as the Type 74.



Automatic Firepower

Machine-guns are at the forefront of all current infantry actions, whether silencing guerrilla ambushes or halting movement in a battle area with sustained fire. In many combat zones, the latest modern weapons serve side by side with guns whose designs predate World War II.

When one considers recent conflicts, a factor readily appreciated is that the modern machine-gun has had considerably less effect on the modern battle scene than might have been expected. In the last few years not many wars have settled down to a hefty war of attrition, the main exception being, of course, the prolonged and bitter war between Iran and Iraq. There the old conditions of trench warfare have been re-established and there the machine-gun still retains the malign dominance that it had during World War I. Both sides use a mixture of weapon types. The Iraqis rely mainly on Soviet-supplied machine-guns, while the Iranians also use Soviet weapons leavened by an assortment of types culled from the international weapons market. In this relatively static campaign the conditions are often very like the protracted days of trench warfare in World War I, long periods of inactivity being dramatically interspersed with short periods of horror when the Iranians attempt to use their manpower in human wave attacks. All too often these massed attacks are easily broken up by machine-gun fire before they can even get close to their target trenches.

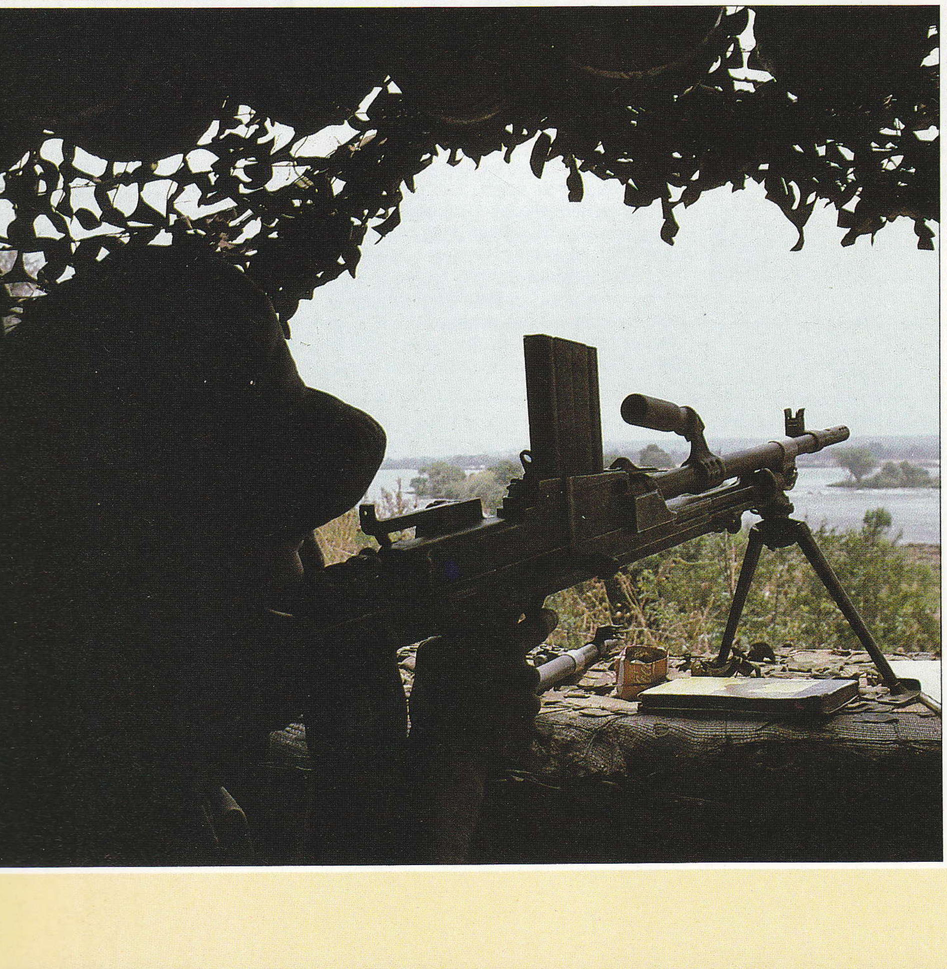
Happily these scenes are not being repeated anywhere else in the world at the moment. On most flashpoint fronts a more fluid and mobile warfare has been apparent, even when a carefully sheltered enemy is attacked by an equally prepared force. Such conditions occurred on several occasions in the Falkland Islands campaign of 1982. There both sides used the machine-gun to equal effect, but one oddity of that campaign was that both sides were using the same weapon. The Argentines had the Belgian FN MAG, while the British forces used the British-made equivalent, the L7A2. At times during that short conflict there were occasions when the machine-guns pinned down one side or the other: at Goose Green, for example, FN MAGs equipped with night-vision sights pinned down the attackers from the Parachute Regiment for long periods during the nocturnal operation. But for most of the time the machine-guns were used mainly in the light machine-gun role, and at the end of it all heaps of Argentine FN MAGs were captured intact. Unhappily they proved to be of little benefit to the victors. In the transition from Belgian to British manufacturing methods and standards so many changes were introduced into the L7 that few parts of the Belgian and British versions can be interchanged. Thus the war booty was of little use to the British army, though the ammunition was and still is.

Away from the South Atlantic, few people outside the surrounding areas are aware that a nasty little war has been conducted along the borders of South Africa and her neighbouring states. In this theatre the South African defence forces have been conducting a constant counter-terrorist campaign against infiltrating 'freedom fighter' groups, which have constantly made limited and small raids into South African territory.

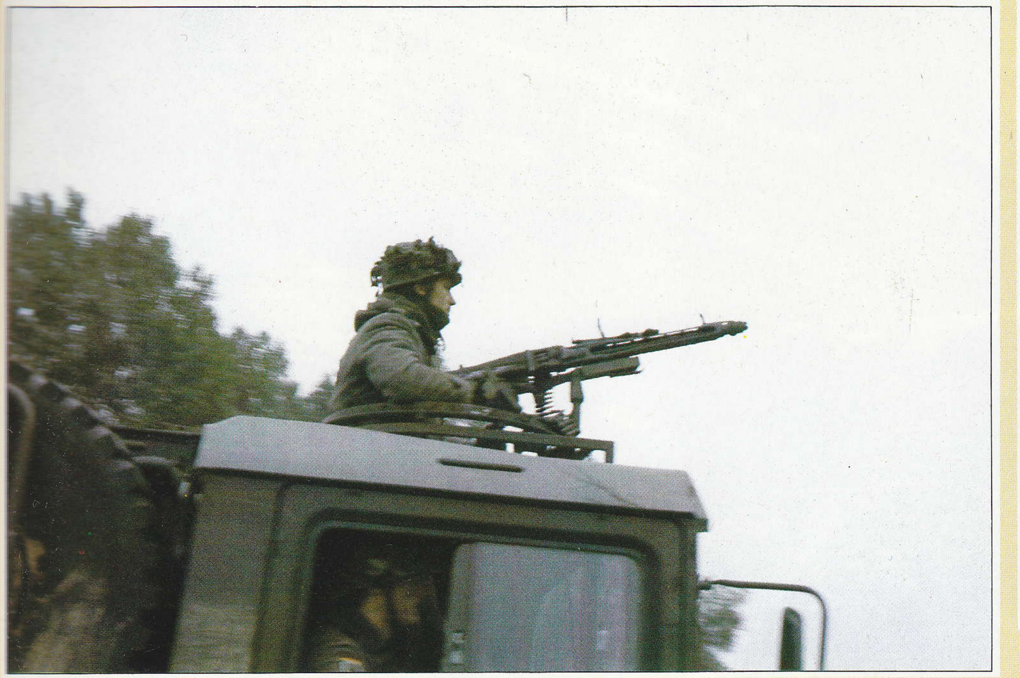
In such wars the machine-gun is rarely of more than limited value, for ranges are usually short and the terrain often prevents vision in any direction for more than a few yards. The South African defence forces have discovered however, that the machine-gun is a powerful anti-ambush weapon. At any sign of an ambush quick bursts of fire from the ubiquitous FN MAG would soon break up any intended attack. In order to provide themselves with superior mobility the South Africans often moved on trucks or light armoured vehicles such as the Buffel (Buffalo), and the best counter to them was soon discovered by the guerrillas to be the land mine, to which machine-guns do little.

But the guerrillas (and especially the SWAPO guerrillas operating out of Angola) did their best to provide themselves with machine-guns. While their Cuban comrades kept themselves and their Soviet-supplied weapons out of the way as much as possible, the SWAPO guerrillas were left to use whatever they could muster: captured weapon displays show some very odd relics, ranging from MG34 to Czech ZB vz 26 weapons. The fact that so many of these machine-guns have been captured by the South Africans is in itself an indication of how little effect they have had on that conflict. Although sporadic outbreaks still occur, that little war now seems likely to be terminated in the very near future although no doubt the South Africans will remain on their guard for some time to come.

Farther north in Africa, unhappy Eritrea is another location of protracted guerrilla warfare carried out with merciless thoroughness by both sides while around them hordes of people starve to death. This is yet another campaign where the machine-gun can do little more than boost the morale of one side or another. The simple fact is that wherever it is fought, guerrilla warfare rarely has much use for machine-guns, although it is conceivable that the new light machine-guns might find a place for their combination of light weight and firepower. Of course the sudden appearance of a determined man in the middle of a civilian community when he is carrying a machine-gun with every show of using it can have a numbing effect on the onlookers. The mere thought of bursts of machine-gun fire in an enclosed area is usually enough to make anyone obey a terrorist's bidding. But for the guerrilla such opportunities are few and far between, although IRA terrorists have killed British soldiers in Northern Ireland with M60s stolen from arsenals in the USA. Machine-guns are not handy things to carry or to hide, and as the emotional and/or propaganda importance of the machine-gun to an underground organization often appears to be greater than its actual worth, the possession of such a weapon frequently imposes a degree of inflexibility and immobility on the group concerned. This also has happened in Northern Ireland, when IRA terrorists have opted to stand and fight in order to buy time for others to get the precious M60 to a safe house. In some cases this has resulted in the capture of the M60 by the British army and the death or imprisonment of the IRA members concerned.

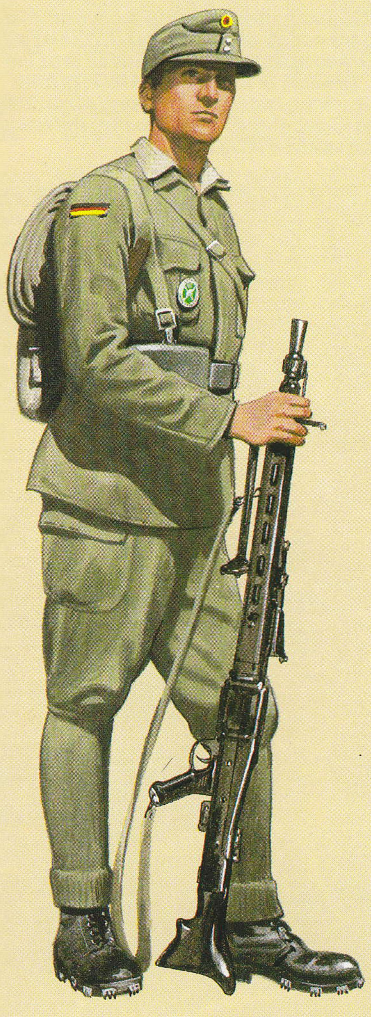


An L4A4, the 7.62-mm version of the Bren, is seen in a South African position on the border of South West Africa. In the struggle against SWAPO the main aim is to prevent the guerrillas entering the country from their sanctuaries in Angola.



Above: A roof mounting for an MG3 is carried on a Bundeswehr truck. This form of mounting can be used against ground targets, but is primarily intended for use as an anti-aircraft defence mounting. 7.62-mm (0.30-in) machine-guns are really too light for anti-aircraft use, but have an important morale role.

American troops from the US Army's component of the Allied Mobile Force (Land) (AMF(L)) alight from a Bell UH-1 helicopter and immediately take up a defensive position with an M60. The gunner is festooned with a spare ammunition belt, while his Number 2 ensures the belt in use is fed cleanly.



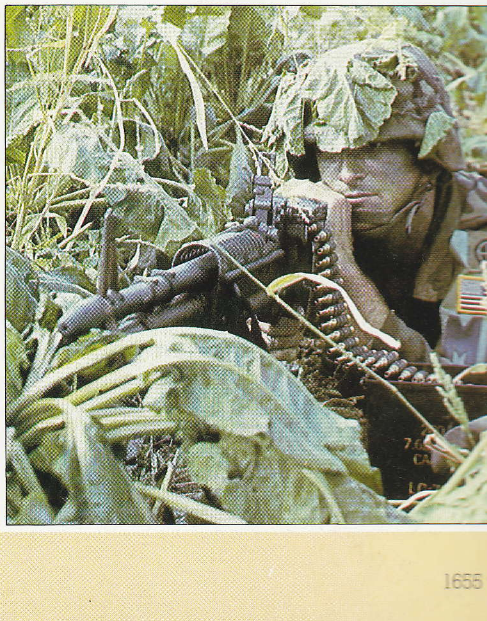
To many observers, the major shooting war in progress today is that being fought daily in Afghanistan, despite the far more massive conflict in progress not far away on the Iran-Iraq borders. Again, this is a war where the machine-gun cannot have much effect on the actual fighting, but where it can have a fearful nuisance effect when handled properly. This is particularly true in the steep mountain valleys where one carefully emplaced machine-gun can hold up a Soviet supply convoy for hours while the hapless Red Army soldiers and Afghan conscripts attempt to find the source of the fire. Fortunately for the Red Army this does not happen often, for the Afghans rely more on their rifles for this sort of ambush. In return the Soviet soldiers can do little more than rake the surrounding hillsides in the hope that some of their rounds find a billet.

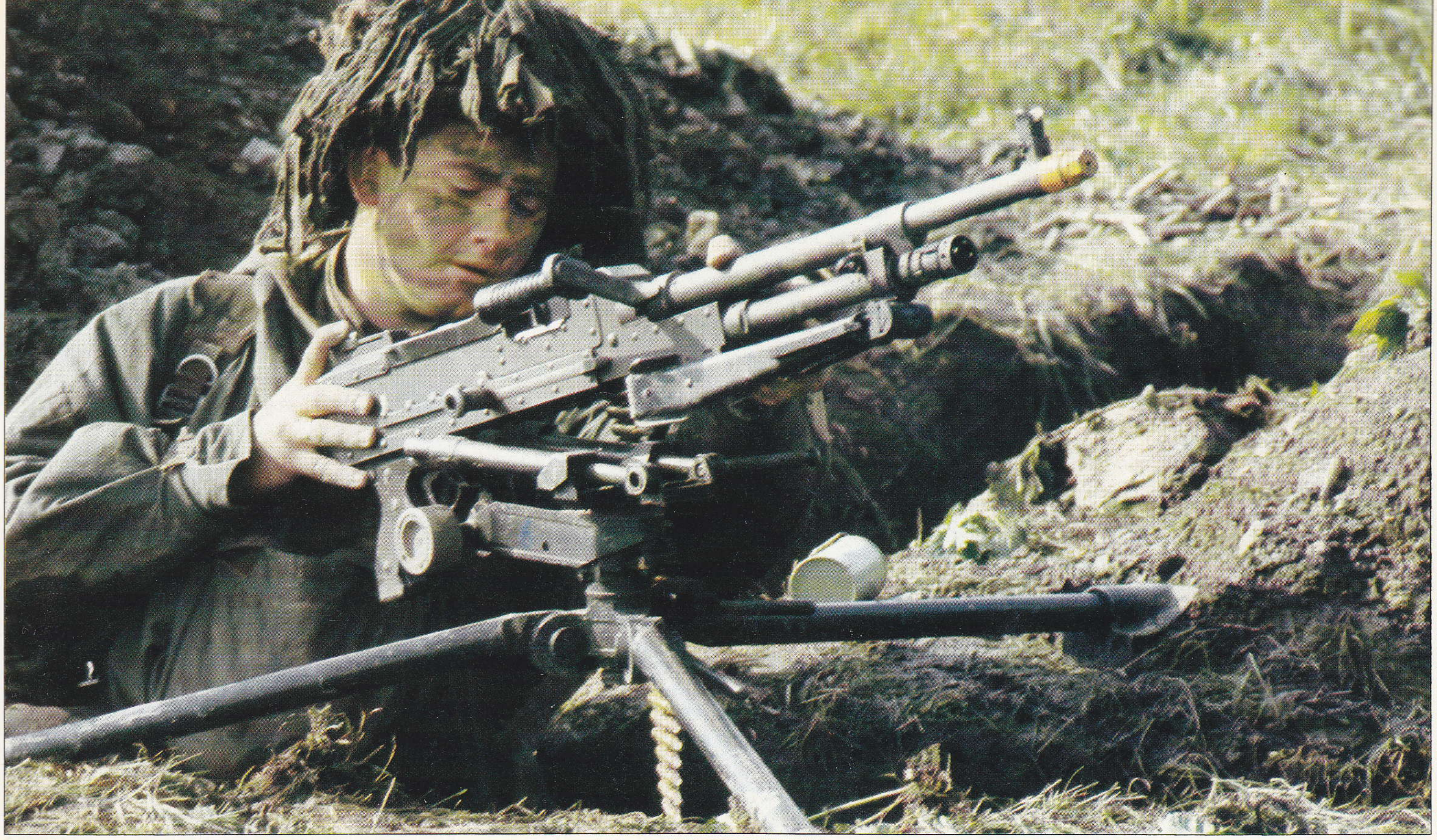
The Afghan campaign has seen one return to an old machine-gun tactic, and that is firing upon fixed lines. During World War I machine-guns were often set up to fire on locations where an enemy was likely to be, rather than to undertake aimed fire at a definite target. This ploy was often used at night (when the target was in any case invisible) and at least it had the advantage that it was likely to deny an easy exit or access point to the enemy. In Afghanistan this practice has once more been found useful. The Afghan guerrillas often creep up to an Afghan army or Soviet outpost and open fire with rockets or rifles in order to harass or demoralize rather than destroy anything important. These missions are usually carried out at night, when the defenders cannot readily see the attackers, so here a few pre-laid machine-guns covering likely approach routes or defiles are simply fired off. The machine-guns are emplaced on tripods with their barrels elevated to the correct degree and with their muzzles kept on target by the use of stakes on each side of the barrel. All the firer has to do is pull the trigger and keep the ammunition feed topped up. As the weapon fires the spread of fire is such that there is a good chance of hitting anything in the chosen field of fire.

In NATO there is at present a state of transition as far as machine-guns are concerned. Many nations, including the USA and the UK, have now chosen to discard the general-purpose machine-gun (GPMG) concept and are reverting to the old ways of using a light machine-gun designed for the job of squad fire support. This will have the advantage of providing the machine-gunner with a far more manageable load and enable the squad to car-

Left: The uniform of the Bundeswehr Gebirgsjäger and the retention of the MG3 for current use, many years after its World War II predecessor the MG42 first appeared, gives the mountain warfare division of the West German army a definite wartime air; but it is simply a case of using the best uniform and weapon for the job.

The American M60 machine-gun is used here in the light machine-gun role by a trooper of the 82nd Airborne Division. The ammunition feed belt can be clearly seen, and both in action and on the move it can be something of a nuisance as it tends to snag anything nearby; the belts can cause jams when twisted.

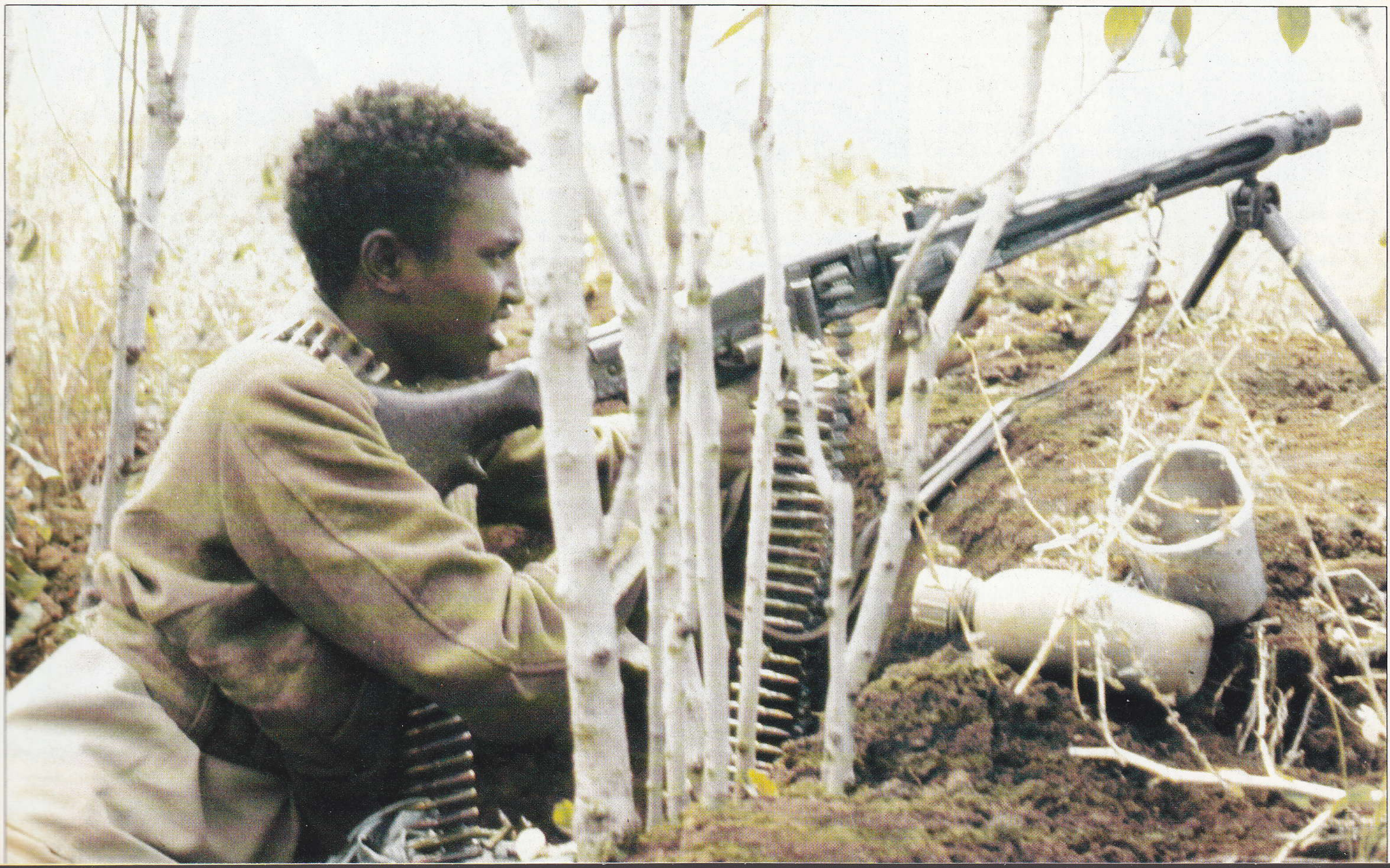




ry just one type of ammunition. At present a squad going into action has to carry ammunition packed into magazines or into belts, which means two logistic loads instead of one. In future the squad fire-support weapon and the standard weapon will use the same box magazines, with all the logistic advantages that this entails. All this is nothing new to the Red Army, which was well to the fore in its post-war tactical analysis and many years ago decided not only to adopt the GPMG concept but also develop a special machine rifle for squad fire support. Thus the Red Army has for long used a mix of APK assault rifles and RPK machine rifles, the latter being used as rather light LMGs. The term light is used advisedly, for the RPK cannot deliver heavy bursts of fire. The Red Army relies upon the PK for this role, which perhaps defeats the object at times, for the PK uses a different ammunition and is also a much heavier weapon. But already the RPK is in the process of being replaced in the Red Army's front-line units by the RPK-74 firing the new 5.45-mm (0.2146-in) round.

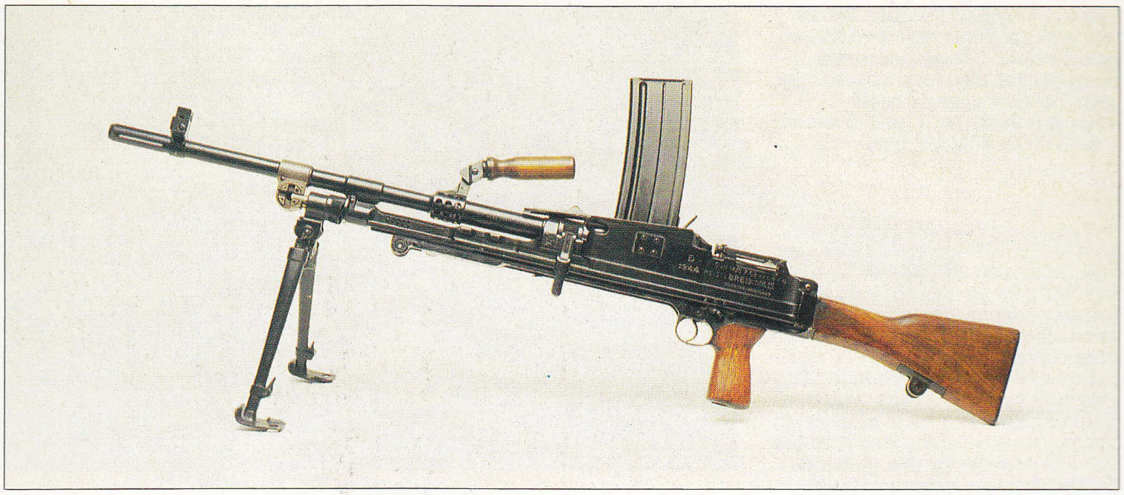
An L7A1 is seen on its buffered tripod for the sustained fire role. The tripod uses a spring mounting to absorb the gun's recoil forces to keep the gun on its selected firing line for long periods without having to constantly re-sight the weapon.

The MG3 and its predecessor, the World War II MG42, are widely used outside NATO and some have turned up in guerrilla hands all over the world. The bulk of these are old MG42s from various stocks, but without looking at markings and detail points they are difficult to differentiate from the modern MG3s.



UK

7.62-mm Bren Gun



The latest version of the venerable wartime Bren gun is the British L4A4, chambered for the NATO 7.62-mm (0.30-in) round. It has a new barrel, breech block and a new vertical 30-round box magazine and is now used by support and second-line British Army units.

When considering modern machine-guns, it seems something of a surprise that a weapon as old as the **Bren Gun** should be included, especially as this weapon can be traced back as far as the early 1930s. But the original Bren Guns were chambered for the 7.7-mm (0.303-in) rimmed cartridge, and when the decision was made to convert to the new standard NATO 7.62-mm (0.3-in) cartridge the British armed forces still had large stockpiles of the Bren Gun to hand. It made sound commercial sense to convert them for the new calibre, and such a programme was soon put into effect at the Royal Small Arms Factory at Enfield Lock in Middlesex.

The conversion to the new calibre entailed a complete overhaul, but the task was made easier by the fact that during World War II a Canadian company produced numbers of Bren Guns in 7.92-mm (0.312-in) calibre for China. As this round was rimless, it was found that the breechblocks intended for the 'China contract' were equally suitable for the new 7.62-mm cartridge and these were used in place of the originals. A new barrel was produced with a chromium-plated interior. This not only diminished wear on the barrel but also reduced the need for the frequent barrel-changes required on World War II versions. Thus the new gun was issued with only the one barrel.

The current version of the Bren Gun used by the British Army is the **L4A4**. This is not used as a front-line infantry weapon, but instead is issued to the many other arms of the service who require a machine-gun. Thus the L4A4 is used by the Royal Artillery for anti-aircraft and ground-defence of its batteries, by the Royal Signals for the defence of its installations in the field, by units assigned for home defence, and so on. The L4A4 is also used by the Royal Air Force, and a version known as the **L4A5** is used by the Royal Navy. There is also a version known as the **L4A3** that is not often encountered as it is a conversion of the old Bren Mk 2 gun; the L4A4 is a conversion of the improved Bren Mk 3.

In all these versions the gas-operated mechanism of the original Bren Gun remains unchanged. So few are the changes involved in the change of calibre that the only points of note are that the 7 62-mm version uses a nearly-vertical magazine in place of the old curved equivalent, and the muzzle lacks the pronounced cone-shape of the old weapon.

For the anti-aircraft role the L4A4 has been fitted with some fairly sophisticated sighting arrangements. The L4A4 does not use a tripod as did the old Bren Guns, but instead it can be mounted on the roof hatches of self-propelled guns and howitzers as well as on other armoured vehicles.

So the old Bren Gun soldiers on in a new form, and there seems to be no sign of its passing from use in the foreseeable future. Many of the Commonwealth nations still use the Bren, some in its original 7.7-mm form, so although the original design may be old the weapon is still regarded as effective and in its L4A4 form the old Bren Gun is as good as many far more modern designs.

Specification

L4A4

Calibre: 7.62 mm (0.3 in)
Weights: gun only 9.53 kg (21 lb); barrel 2.72 kg (6 lb)
Lengths: gun 1133 mm (44.6 in); barrel 536 mm (21.1 in)
Muzzle velocity: 823 m (2,700 ft) per second
Rate of fire: (cyclic) 500 rpm
Type of feed: 30-round box

UK

5.56-mm Light Support Weapon (LSW)

With the FN rifle about to be replaced by the 5.56-mm Individual Weapon, the British Army is adopting a squad support weapon of the same calibre to replace the FN MAG general purpose machine-gun. The latter will be retained for the sustained fire role.

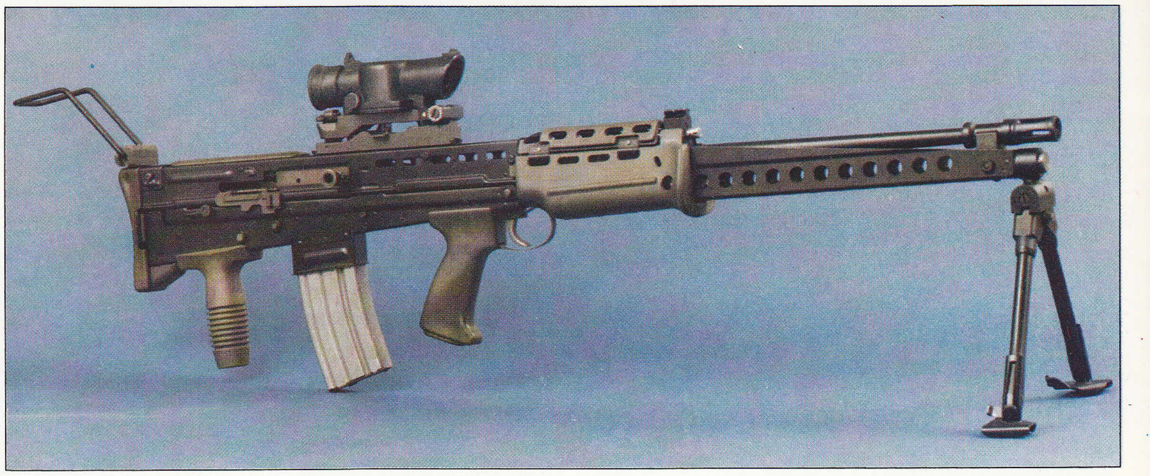
Seen here in front of the GPMG is the 4.85-mm version of the Light Support Weapon, produced to complement the proposed 4.85-mm rifle. When NATO adopted the Belgian 5.56-mm round as standard, the 4.85-mm designs were abandoned despite their superior performance.

For many years the standard squad light machine-gun for the British army has been a version of the FN MAG fitted with a bipod and known as the L7A2. While this is a fine weapon, it is rather a cumbersome load and it fires a cartridge that is now generally considered too powerful for the squad-support role. With the imminent arrival of the Enfield Weapon System (or Small Arms 80, otherwise SA 80), the L7A2 is due to be replaced in the squad support role by a new weapon currently known as the **XL73E2 Light Support Weapon** or **LSW**; the L7A2 will be retained for the sustained-fire function for some years to come.

The LSW is one half of the Enfield Weapon System, the other component being the Individual Weapon or IW, which will be the standard rifle while the LSW will become the squad-support weapon. The two new weapons have many things in common and can be easily recognized as coming from the same stable, but the LSW has a heavier barrel and a light bipod mounted well forward under the barrel. There is also a rear grip under what might be regarded as the butt to provide the firer with a better hold for sustained firing.

The term butt is rather misleading as the LSW is based on a 'bullpup' layout in which the trigger group is placed forward of the magazine. This arrangement makes the LSW more compact than a conventional weapon. Much of the LSW is steel, but the foregrip and the pistol grip for the trigger are tough nylonite. The LSW uses the same magazine as the IW, namely a standard M16A1 30-round box.

The LSW has undergone several changes of calibre since it was first mooted. Originally it was calibred for the British experimental 4.85-mm (0.19-in) cartridge, but this was overruled in favour of the American M193 cartridge, which in turn was superseded yet again in favour of the new NATO standard 5.56-mm (0.219-in) SS 109. The first production versions will be for the SS 109 round, and will also have an optical sight known as the Sight Unit Small Arms Trilux or SUSAT mounted on a bracket over the receiver. It will be possible to change this sight for some form of night sight.



The Light Support Weapon shares many components with the 5.56-mm rifle; obvious differences are the heavy barrel, the bipod and the rear grip. The LSW uses the same magazine as the Individual Weapon – the 30-round M16A1 box.

Various accessories will be available for the LSW once it gets into service, which should be some time during 1985 if the current trials go well. A training adapter firing low-powered ammunition will be available, as will a blank-firing attachment. A multi-purpose tool is already in use for stripping and first-line repairs, and it will be possible to fit a sling for carrying. The muzzle attachment is so arranged that it is possible for rifle grenades to be fired from the muzzle, although it is not envisaged that the LSW will be used extensively for this purpose.

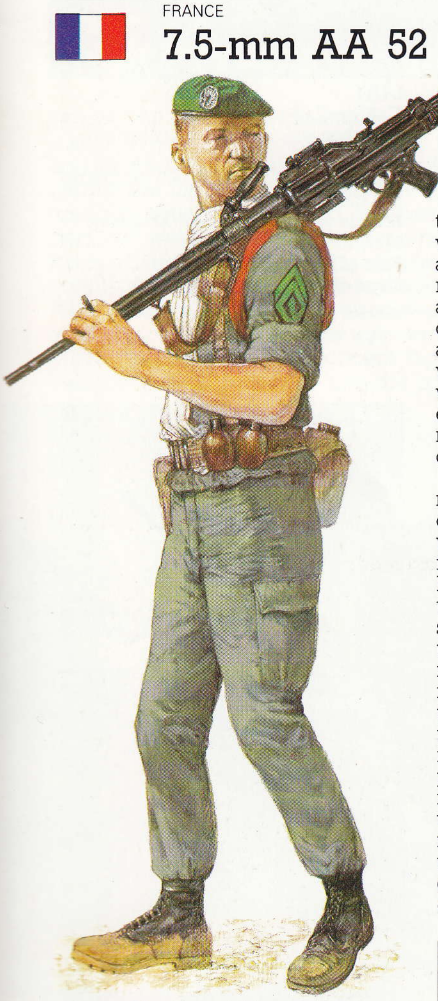
The LSW has undergone a protracted development period, some of the period being elongated by the change of NATO standard calibre and other considerations. By the time it reaches the hands of the troops in the near future the LSW should be an excellent weapon with no bugs left to iron out.

Specification

LSW
Calibre: 5.56 mm (0.219 in)
Weights: gun complete and loaded 6.88 kg (15.17 lb); gun less magazine and sight 5.6 kg (12.346 lb)
Lengths: overall 900 mm (35.43 in); barrel 646 mm (25.43 in)
Muzzle velocity: 970 m (3,182 ft) per second
Rate of fire: (cyclic) 700-850 rpm
Type of feed: 30-round box magazine

FRANCE

7.5-mm AA 52



Above: The French Foreign Legion use exactly the same weapons as the rest of the French army and so the AA 52 machine-gun, seen here in its light machine-gun form, is a familiar sight wherever the legion operates.

The machine-gun now known as the **AA 52** was designed and developed directly as a result of the Indo-China campaigns of the early 1950s. At that time the French army was equipped with a wide array of American, British and ex-German weapons, and the furnishing of support and spares for this array was too much for the army, which decided to adopt one standard general-purpose machine-gun. The result was the 7.5-mm (0.295-in) AA 52, a weapon designed from the outset for ease of production, and thus making much use of stampings and welded components.

The AA 52 is unusual among modern machine-guns in relying on a form of delayed-blowback operation, in which the force of the cartridge firing is employed to force back the breech block to the starting position, and also to power the feed mechanism. This system works very well with pistol cartridges in sub-machine guns, but using rifle cartridges in machine-guns demands something more positive if safety is to be regarded. On the AA 52 a two-part block is used: a lever device is so arranged that it holds the forward part of the block in position while the rear half starts to move to the rear; only when the lever has moved a predetermined distance does it allow the forward part of the block to move back. In order to make the spent cartridge easier to extract the chamber has grooves that allow gas to enter between the chamber wall and the fired cartridge to prevent 'sticking', and a cartridge fired from an AA 52 can always be recognized by the fluted grooves around the case neck.

The AA 52 can be fired from a bipod or a tripod, but when a tripod is used for the sustained fire role a heavy barrel is fitted to the weapon. When used in the light machine-gun role the AA 52 is a rather clumsy weapon to carry, especially if a 50-round ammunition box is carried on the left-hand side. For this reason the box is often left off and the ammunition belt allowed to hang free. One unusual feature of the AA 52 is that for the light machine-gun role a monopod is fitted under the butt. This can be awkward at times, and another awkward point is the barrel change: the barrel can be removed readily enough, but the bipod is permanently attached to the barrel and in the light machine-gun role this can make barrel-changing very difficult, especially as the AA 52 barrels have no form of barrel plating that might reduce the temperature of the gun and barrel.

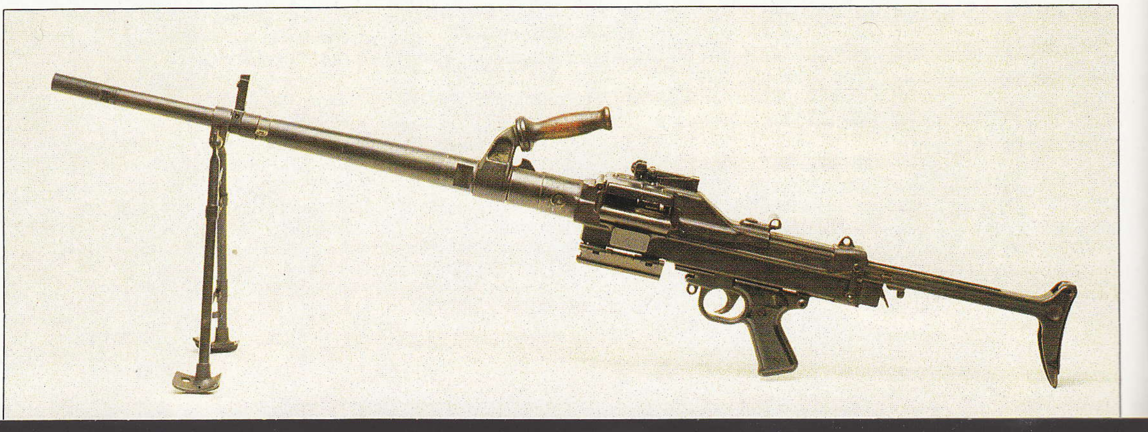
The AA 52 was originally intended to fire a 7.5-mm (0.295-in) cartridge first developed for use by the mle 1929 light machine-gun. This cartridge is powerful enough, but the switch to the NATO 7.62-mm (0.3 in) cartridge left the French army using a non-standard cartridge, and export prospects for the AA 52 were thus reduced. The basic design has therefore been adapted to fire the NATO cartridge in a version known as the **NF-1**. Some of these have been issued to French army units, but exports have not materialized.

Overall the AA 52 is an adequate machine-gun, but it has many features (some of them regarded by some nations as inherently unsafe) that are at best undesirable. The weapon is no longer in production but is still offered for export.

Specification

AA 52
Calibre: 7.5 mm (0.295 in)
Weights: with bipod and light barrel 9.97 kg (21.98 lb); with bipod and heavy barrel 11.37 kg (25.07 lb); tripod 10.6 kg (23.37 lb)
Lengths: with butt extended (light barrel) 1145 mm (45.08 in) or (heavy barrel) 1245 mm (49.02 in); light barrel only 500 mm (19.69 in); heavy barrel only 600 mm (23.62 in)
Muzzle velocity: 840 m (2,756 ft) per second
Rate of fire: (cyclic) 700 rpm
Type of feed: 50-round belt

The French AA 52 uses a delayed blowback mechanism with a fluted chamber to ease extraction. A 7.62-mm (0.30-in) version known as the AA 7.62 NF-1 may also be encountered, but neither model is now in production. Bipod and tripod versions are in use, as are vehicle-mounted models.



WEST GERMANY

Heckler & Koch machine-guns

The West German concern Heckler & Koch, based at Oberndorf-Neckar, is among the most prolific of all modern small-arms designers, and in addition to its successful range of assault rifles and sub-machine guns it also produces a wide variety of machine-guns. It may be an oversimplification, but Heckler & Koch machine-guns are basically modified versions of the company's G-3 and associated assault rifles. They all use the same delay-roller mechanism on their breech blocks, and some of the light machine-guns are simply rifles with heavier barrels and a bipod. To confuse the issue, Heckler & Koch produce virtually every model in belt- and magazine-fed versions, and some are produced in 7.62-mm (0.3-in) NATO or 5.56-mm (0.219-in) calibres, with the added variation in the latter for the new SS 109 cartridge or the older American M193.

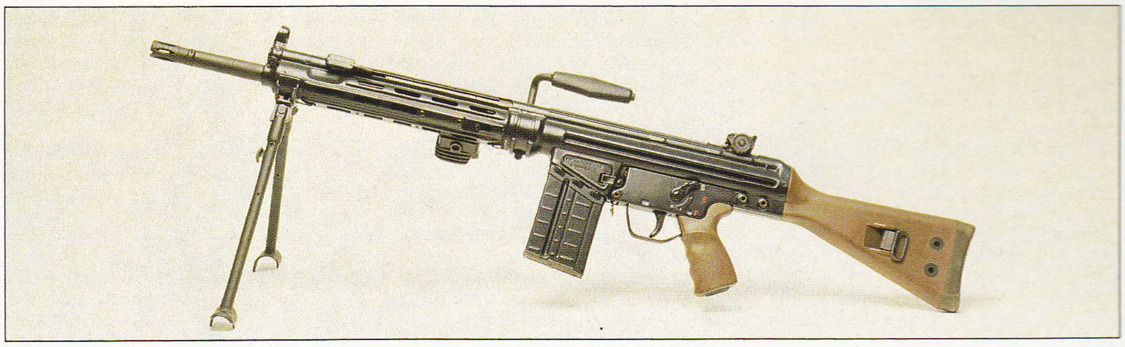
One of the 'base' models in the range is the 7.62-mm **HK 21A1**, a development of the earlier **HK 21** which is no longer in production. The HK 21A1 uses a belt feed and may be used as a light machine-gun on a bipod or in the sustained-fire role on a tripod. For the latter, barrel changing is incorporated. Even in this version of the Heckler & Koch range the outline of the G-3 is apparent, and this is carried over to the latest versions of the HK 21, the **HK 21E**, which has a longer sight radius and a three-round burst selection feature. The barrel is longer, and changes have been made to the ammunition feed. There is also a 5.57-mm counterpart to this variant, and this is known as the **HK 23E**.

All the variants mentioned above are belt-fed weapons. There is also a magazine-fed version for every one of them: the **HK 11A1** is the magazine counterpart of the HK 21A1, while the **HK 11E** and **HK 13E** are the magazine counterparts of the HK 21E and HK 23E.

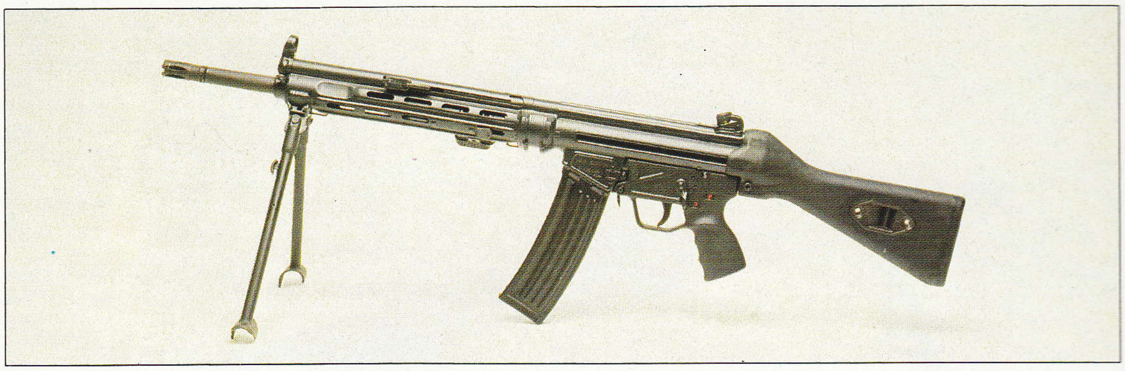
All this may sound rather confusing, but the basic factor that emerges is the ability of Heckler & Koch to produce a machine-gun suited to virtually any requirement. The belt-fed versions may be regarded as general-purpose machine-guns (although the 5.56-mm versions may really be too light for the sustained-fire role), and the magazine-fed versions as true light machine-guns. They offer a surprising amount of interchangeability of spare parts, and the magazines are usually the same as those used on their equivalent assault rifles, making the use of the automatic guns as squad support weapons even easier.

Specification

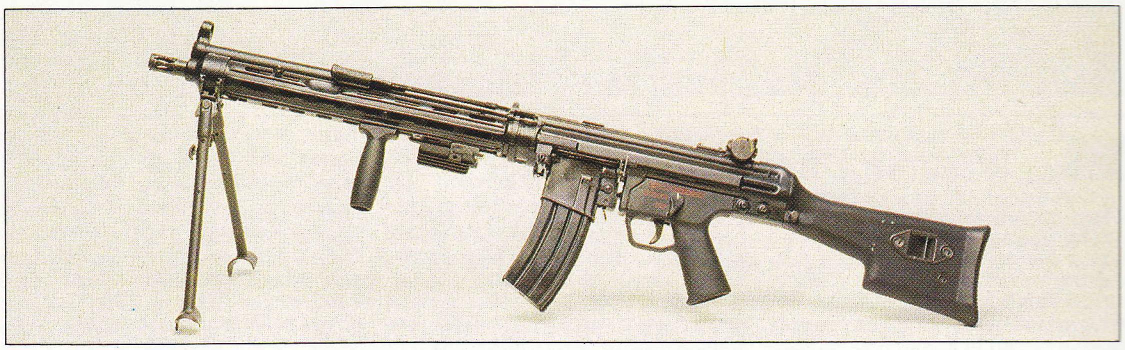
HK 21A1
Calibre: 7.62 mm (0.3 in)
Weights: gun with bipod 8.3 kg (18.3 lb); barrel 1.7 kg (3.75 lb); 100-round ammunition box 3.6 kg (7.94 lb)
Lengths: overall 1030 m (40.55 in); barrel 450 mm (17.72 in)
Muzzle velocity: 800 m (2,625 ft) per second
Rate of fire: (cyclic) 900 rpm
Type of feed: 100-round belt



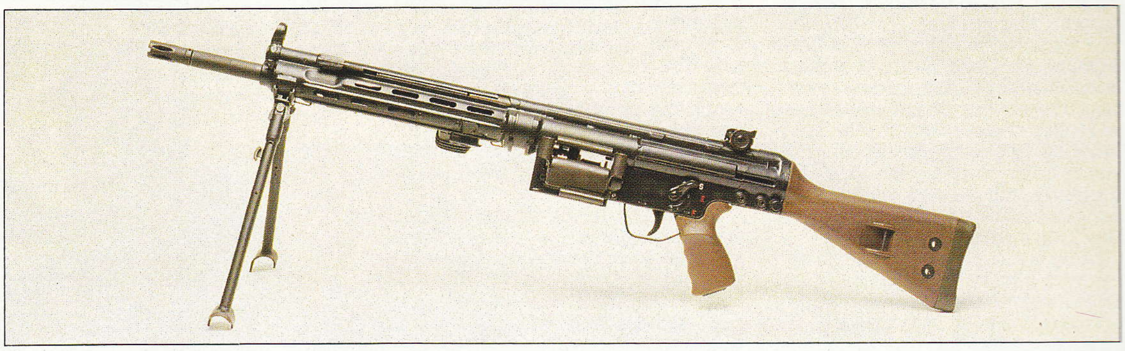
The Heckler & Koch HK 11 is the box magazine feed variant of the HK 21 and is a 7.62-mm (0.30-in) weapon.



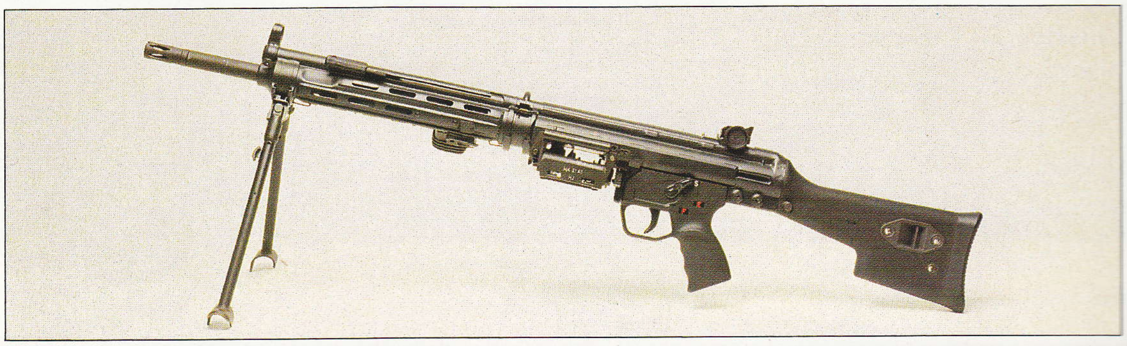
The Heckler & Koch HK 13 is produced in several versions. This model accommodates a 40-round box magazine.



The Heckler & Koch HK 13E has a three-round burst capability as well as full automatic fire.



The Heckler & Koch HK 21 is no longer produced, but is still in use with nations such as Portugal.



The HK 21A1 is a development of the earlier HK 21. It uses a belt feed only, but the belt can be contained in a box slung under the receiver.

WEST GERMANY

7.62 mm MG3

One of the outstanding machine-gun designs of World War II was the MG42, a weapon that introduced the advantages of mass production to an area of weapon design that had for long clung to traditional methods of construction. With the MG42, the new era of steel pressings, welds and the elimination of many machining processes was allied to an excellent design that attracted widespread respect and attention. Thus, when the Federal Republic of Germany became a member of NATO and was once more allowed a measure of weapon production for rearmament, the MG42 was one of the first designs to be resurrected.

The original MG42 had a calibre of 7.92 mm (0.312 in), but with the adoption of the standard NATO 7.62-mm (0.3-in) round the old design was reworked to accommodate the new calibre. At first stockpiled MG42s were simply modified to this calibre with the designation **MG2**, but in parallel with this activity a production programme was under way by Rheinmetall to produce new weapons in 7.62-mm calibre. There were several variants of this production version, all having the designation **MG1**, although there were some minor changes to suit ammunition feed and so on. The current production version is the **MG3**, still manufactured by Rheinmetall.

In appearance, the war-time MG42 and the MG3 are identical apart from some minor details, few of which can be detected by the untrained eye, and there are more changes between the MG1 and MG3. Overall, however, the modern MG3 retains all the attributes of the original, and many of the mountings used with the MG3 are just adaptations or modifications of the World War II originals. Thus the MG3 can be used on a tripod that is virtually identical to the original, and the twin mounting for anti-aircraft use could still accommodate the MG42 without trouble. There are now available many mountings for the MG3.

The original MG42 was designed for ease of mass production, and this same feature makes the MG3 very suitable for manufacture in some of the less well-equipped arsenals that now abound in 'third-world' nations. The MG3 has proved to be relatively easy for such facilities and it is now licence-produced in nations such as Pakistan, Chile, Spain and Turkey; some of these nations fabricate versions of the MG1 rather than the MG3 proper. Yugoslavia also produces a version of this weapon, but the Yugoslav model is a direct copy of the MG42, still in 7.92-mm calibre and designated **SARAC M1953**.

Within NATO the MG3, or one or other of its variants, are used by the Bundeswehr, by the Italian armed forces, and by nations such as Denmark and Norway. Portugal makes the MG3 for use by the Portuguese armed forces, and is now offering the type for export. Thus from many sources the old MG42 design soldiers on. There is even talk of further development to produce a lighter version, but this is proceeding at a low priority, for the basic design of the MG3 is still as sound as it ever was, and any attempt to improve or modify the original appears to many to be an exercise about as fruitful as redesigning the wheel.

Specification

MG3

Calibre: 7.62 mm (0.3 in)

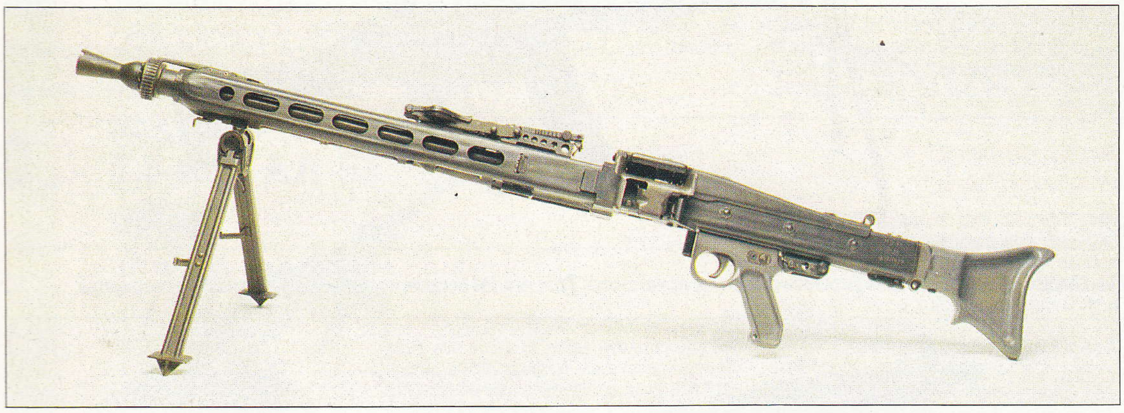
Weights: basic gun 10.5 kg (23.15 lb); bipod 0.55 kg (1.213 lb); barrel 1.8 kg (3.97 lb)

Lengths: gun with butt 1225 mm (48.23 in); gun less butt 1097 mm (43.19 in); barrel 531 mm (20.91 in)

Muzzle velocity: 820 m (2,690 ft) per second

Rate of fire: (cyclic) 700-1,300 rpm

Type of feed: 50-round belt



The West German MG3 is the modern version of the wartime MG42, and is currently rated as one of the best machine-guns of its type used by NATO. It has a high rate of fire and an easy and rapid barrel change, and can be fired from the bipod shown or from a heavy tripod for the sustained fire support role.

BRAZIL

7.62-mm Uirapuru Mekanika

Over recent decades Brazil has changed from being a defence-equipment importer to a nation that exports over 95 per cent of its defence industry's produce. The nation has undoubted talent for the defence-based industries, and in an effort to harness some of this talent to producing small arms a design team was established in the early 1960s to develop a general-purpose machine-gun. This first design team was led by a team of three experts, but while its initial designs worked they had many inherent problems. These were too numerous for the possibility of acceptance by the Brazilian army, who turned the design problem over to a private concern. This fared no better than the original team, so one of the original triumvirate took over the project on his own.

Using the facilities of a design and research establishment, this individual approach worked. Thus there emerged a design now known as the **Uirapuru Mekanika** after a Brazilian jungle bird. The Uirapuru is a general-purpose machine-gun firing standard NATO 7.62-mm (0.3-in) ammunition. It can be used as a light machine-gun with a butt and bipod, or it can be fired from a heavy tripod for the heavy machine-gun role. It can also be fitted with a solenoid for use as a co-axial weapon on armoured vehicles, and it can be adapted to firing from a number of other mounts.

In appearance the Uirapuru is a rather long, ungainly-looking weapon, especially when fitted with a butt for the light machine-gun role. It uses a conventional gas-operated mechanism with an orthodox belt feed for the ammunition, and the barrel can be changed rapidly using a handle that also acts as a carrying handle for the weapon. The receiver of the weapon is very simple, being little more than a length of tube containing the breech block and its return spring. What appears to be a rectangular receiver is in fact the ammunition feed mechanism. The method of tapping off gas from the barrel is also simple. No gas regulating block or valve is used, the gas impingeing directly onto the return mechanism. No provision appears to have been made for firing single shots.

The barrel of the Uirapuru has a large pepperpot-type muzzle brake and it is recommended that the barrel is changed after every 400 rounds have been fired. Most of the parts appear to require some machining, which should ensure a rugged construction. The Brazilian army gave its approval to the Uirapuru after lengthy trials, and the type is now being prepared for full production at a factory near Rio de Janeiro. If past Brazilian salesmanship is any guide, it will not be long before the first examples are seen outside Brazil, for if the Uirapuru can withstand the varied combat conditions that can be encountered in Brazil it will put up with virtually anything, and the simple construction certainly should keep the price of a weapon down.

Specification

Uirapuru Mekanika

Calibre: 7.62 mm (0.3 in)

Weight: with butt and bipod 13 kg (28.66 lb)

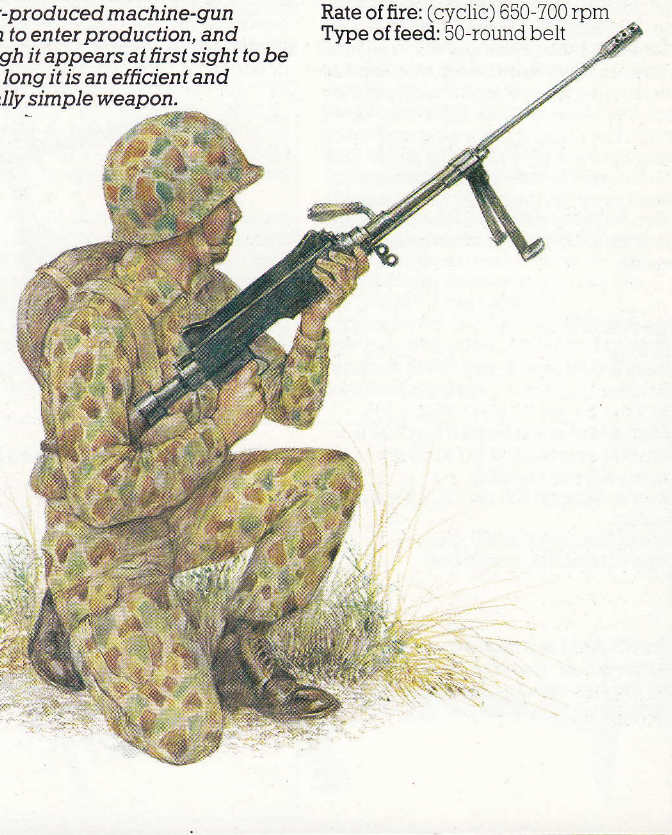
Lengths: with butt 1300 mm (51.2 in); barrel 600 mm (23.62 in)

Muzzle velocity: 850 m (2,789 ft) per second

Rate of fire: (cyclic) 650-700 rpm

Type of feed: 50-round belt

The Brazilian 7.62-mm (0.30-in) Uirapuru Mekanika is the first locally-produced machine-gun design to enter production, and although it appears at first sight to be rather long it is an efficient and basically simple weapon.



Iran

Spearheading both the military effort and the Islamic revolution inside Iran are the Revolutionary Guards. 125,000 strong, their equipment is motley and their training mediocre, but their determination to stamp the Middle East with their brand of extremist religion ensures continuing conflict.

Since the fall of the late Shah of Iran in January 1979, Iran has been ruled by a group of Moslem fundamentalists, and in this fact lie the main strengths and weaknesses of the modern Iranian armed forces. The strengths include what is virtually a nation in arms defending its territory and its faith, the latter producing a military fervour that provides a powerful morale and motivating force. The weaknesses come with the same Moslem fundamentalism applied to power politics in which the armed forces have been purged and 'cleansed' of any personnel or influences thought to endanger the status or power of the regime. Thus professional military personnel have been either executed or removed from office, leaving military direction to various forms of revolutionary guards who have repeatedly shown themselves to have more fervour for action than military ability. In foreign affairs the fundamentalist regime has conducted itself in such a way that it has virtually no allies to provide support of any kind, and the internal economics of Iran are now a shambles.

During the Shah's regime the armed forces (particularly the army) were provided with all they desired and more. Vast sums from oil revenues were spent on obtaining the finest equipment on the market and a lavish support infrastructure was established, often employing imported knowhow and personnel. With the fall of the Shah all this changed. The armed forces became the subject of scrutiny and suspicion, and many senior officers were simply killed or allowed to leave the country. Then in September 1980 came the war with Iraq.

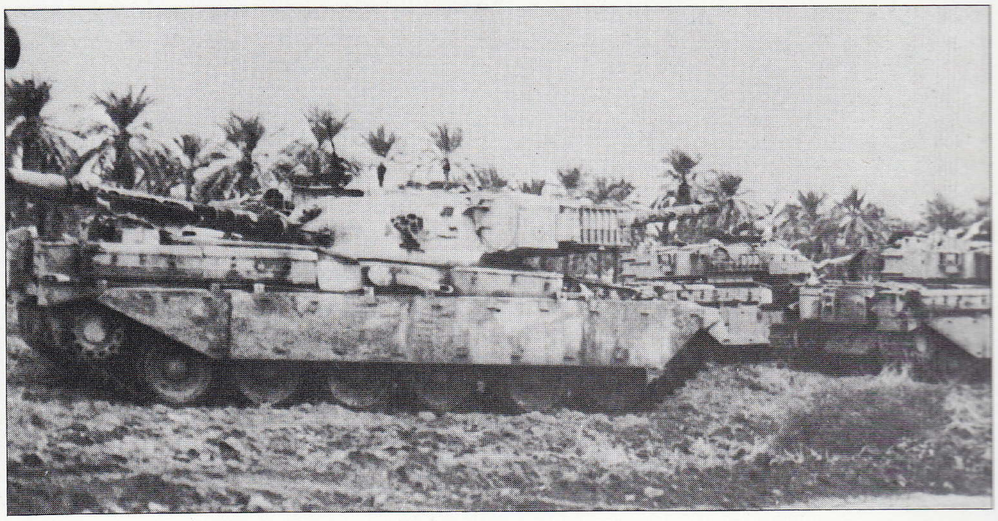
At first the Iranian armed forces did well, severely repulsing the invading Iraqis. But the war then degenerated into two opposing defensive lines, and despite a number of offensives and counter-offensives the war has now settled into a conflict of simple attrition and waiting for one side or the other to break. The war has also seen the loss of a great deal of the Iranian armed forces' equipment, either by enemy action or through lack of spares and maintenance. Thus the army is now severely limited in the numbers of weapons it has to hand, and the air force has only a handful of serviceable aircraft left. The navy has all but ceased to exist apart from a few coastal vessels. For this reason it is not possible to publish an 'Order of Battle', for any manpower or weapon totals would be at best simple guesses or pure hypothesis.

The Iranian Army

The Iranian army can now be roughly divided into three main components: the old regular army together with its conscript bulk; the Revolutionary Guard Corps or *Pasdaran*, the loose organization that now provides the bulk of Iran's military manpower; the *Bassej*, who may be regarded as little more than barely trained cannon-fodder; and the *Herzbollahi*, who are a form of home defence force of about the same military status as the *Bassej*.

The regular army now exists as a closely defined force of about 50,000 officers and men, whose main role is to train the conscripts who pass through the ranks at the rate of about 100,000 at any one time to complete their 24 months' service (although few complete the full term). At one time the army had three armoured divisions equipped with Soviet T-54/55s and T-62s (about 190) along with a force of 300 Chieftains and 300 M47s or M48s and 150 M60s. Exactly how many of this force are left is now almost impossible to say. Many have been lost to enemy action, and more have been dug into the defensive fixed lines along the border between Iran and Iraq to act as pillboxes. Large numbers must be unserviceable for lack of spares and the required maintenance. The same must be said of most of the army's other equipment, which ranges from Soviet trucks and BMP MICVs to Brazilian EE-9 armoured cars. Much of the artillery, which includes the usual array of Soviet and American towed and self-propelled equipments, appears still to be operational, but ammunition stocks for most of the guns, including the Soviet 122-mm (4.8-in) rocket-launchers, must by now be getting low. For anti-aircraft defences the army has to rely on light towed weapons rather than the more complex US Improved HAWK and Soviet self-propelled ZSU-23-4.

While the army is still retained for its expertise and staff ability, combat is now generally assumed by the *Pasdaran*, or Revolutionary Guard Corps.



Iranian Chieftains captured intact by the Iraqis outside Abadan in 1981. Despite their qualitative superiority, some 200 Chieftains fell into Iraqi hands as the Iranian army, weakened by the loss of professional officers, retreated in confusion. There are reports that some of the captured Chieftains are being overhauled by the Iraqis before delivery to the Royal Jordanian army in return for King Hussein's assistance.

12 PASS

Six Lockheed P-3F Orions were procured before the revolution. It is now believed that only two aircraft are fully operational, with two lost and two cannibalized. Operations are conducted from Bandar Abbas (Tactical Air Base No. 9).

Formed out of the eager revolutionaries who brought about the fall of the Shah, this is now a revolutionary shock force whose men are regarded as the main defenders of the Moslem fundamentalist movement. They number about 150,000, and are infantry-based with appropriate equipment. What supporting weapons they require they take from the army. The *Pasdaran* is organized into battalions which operate in brigade groups, sometimes in co-operation with the army and sometimes independently. There are supposed to be naval and air elements of the *Pasdaran*, but such elements are believed to be nominal only.

The *Bassej* is at least partially trained and equipped with small arms (the usual Iranian service rifle is the Heckler und Koch G3). Operationally, the young and almost fanatical volunteers are attached to front-line units: they are used mainly as massed infantry in the offensive, and generally advance in the 'human wave' formation that produces massive casualties in their ranks. Of late volunteers for the *Bassej* have started to fall in number, so its ranks have been swelled by hapless members of the *Herzbollahi*. This organization is nominally a home-defence force, but the total of no less than 2,500,000 comprises all available able-bodied men and youths. Many members are volunteers, but many others are detailed by local administrations to meet imposed quota requirements. Training for the bulk of the members is at best sketchy, and few weapons are available until the men are sent to a front. In many cases fanaticism has made the *Herzbollahi* units into formidable combat forces, but their casualties have been very high.

In addition to the three main formations mentioned above, the army can still call upon a few reserves who have passed through the army conscript or regular training process, though most of these assets have now been impressed into some form of service or another. The army has available the gendarmerie, which includes border guards and the *Mostazafin* (a type of civil guard), but both of these are usually assigned to internal security.

In all its forms the Iranian army is still a formidable fighting force, though it is now being drastically affected by a general lack of equipment, spares and ammunition. As a result of the extreme policies adopted by Iran's Islamic ruling elite there now appears to be little chance that this situation will be remedied in the near future. The only practical ally now possessed by Iran is North Korea, and as North Korean aid has to be airlifted in Boeing 747SP transports, such aid is very limited although reports have been made that some Type 59 tanks have been delivered.

At one time the Army Aviation Command disposed of 65 light aircraft and some 470 helicopters. How many of these are still operational it is impossible to discover. Heaviest of the helicopters were 92 Boeing Vertol CH-47C Chinooks.

The Iranian Air Force

The late Shah lavished as much attention and money on the air force as he did upon the army, but with his fall the air force suffered rather more from the Islamic fundamentalists than did the army. Many of the air force officers were considered as too 'westernized' by the new regime and were treated accordingly. Many were either executed or forced to leave the country; some did so by desertion (a course of action still widespread), taking their aircraft with them: not surprisingly this has had a disastrous effect on the combat efficiency of the air force. Many of the best men have now gone, and this situation is exacerbated by the lack of spare parts and maintenance for the more sophisticated equipment, among which can be found some of the most advanced aviation hardware in existence.

For example, at one time the air force had four squadrons equipped with a total of 77 Grumman F-14A Tomcat fighters. It is now doubtful if more than five could be made operational, and those only by a process of cannibalization of other aircraft. The same could be said of the 90 McDonnell Douglas F-4 Phantoms that once equipped 10 squadrons. Now fewer than 10 are left and these are reserved for the defence of oil installations and the capital, Tehran. It is likely that larger numbers of Northrop F-5E and F-5F fighters are still operational as these are much simpler aircraft to maintain, and one source states that about 50 remain. The same can be said for the fleet of Lockheed C-130 transports, and a number of the original fleet of 52 are still operational. It is unlikely that many of the Rapier and Tigercat surface-to-air missile squadrons are still operational.

Some of the fleet of 12 Boeing 707 and seven Boeing 747 transport aircraft (some of the Boeing 707s were also used as tankers but this role is unlikely to have been retained) are still operational and maintain a tenuous link with the commercial arms trade abroad, through which some spares for the F-4s and F-5s have been channelled. High prices are known to have been paid for such purchases despite the fact that many of these spares are of doubtful quality. Reports have been made that some new aircraft have been obtained via North Korea, mainly MiG-19s and MiG-21s along with ex-Chinese F-6 fighters, but these reports have yet to be confirmed.

The Iranian Navy

The Iranian navy has never been a large naval force, but the recent war has made it much smaller and current operational missions are confined largely to coastal patrols and the defence of the oil installations at Kharg Island. At one time the main strength of the navy was invested in three destroyers and four frigates (some of them missile-armed), but most of these are now either harbour-bound or have been lost during combat missions against Iraqi naval forces. The rest of the vessels are either ex-American corvettes (of which only two out of four now remain) and a larger number of small patrol vessels. It must be assumed that the fleet of eight SRN-6 and six BH-7 hovercraft is no longer operational.

A small navy air arm is still maintained, and some reports mention that two Lockheed P-3F Orions are still operational. A fleet of 16 helicopters (10 Sikorsky SH-3Ds and six Sikorsky RH-53Ds) may still be operational, but the helicopters are no doubt subject to the same spares restrictions as the equipment of other armed forces. However, the navy is able to obtain some sort of priority due to its importance in guarding the oil installations and shipping lanes on which the shaky Iranian economy still depends. The recent attacks on oil tankers in the Persian Gulf have emphasized the importance of the maritime approaches to Kharg Island, and many of the remaining navy vessels are now stationed near there; other bases are at Bandar Lengeh, Bandar Abbas, Bushehr, Bandar-e-Khomeini and Bandar-e-Anzali.

A Soviet-supplied BM 21 122-mm 'Katyusha' rockets Iraqi positions on the southern front. Since the Iraqi invasion ground to a halt, the war has stagnated into a series of artillery duels punctuated by clumsy Iranian counterattacks. The BM 21 fires a 40-rocket salvo to a maximum range of 20.5 km (12.7 miles).